

## Figure 1

### Anti-CD3 WT

GATATCAAACTGCAGCAGTCAGGGGCTGAACTGGCAAGACCTGGGGCCTCAGTGAAGATGTCCT  
GCAAGACTTCTGGCTACACCTTTACTAGGTACACGATGCACCTGGGTAAACAGAGCCTGGACA  
GGTCTGGAATGGATTGGATACATTAACTAGCCGTGTTATACTAATTACAATCAGAAGTTC  
AAGGACAAGGCCACATTGACTACAGACAAATCCTCCAGCACAGCCTACATGCAACTGAGCAGCC  
TGACATCTGAGGACTCTGCAGTCTATTACTGTGCAAGATAATTATGATGATCATTACTGCCCTTGA  
CTACTGGGCCAAGGCACCACTCTCACAGTCTCCTCAGTCGAAGTGGAAGTGGAGGTTCTGGT  
GGAAGTGGAGGTTCAGGTGGAGTCGACGACATTCAAGTGAACCCAGTCTCCAGCAATCATGTCTG  
CATCTCCAGGGAGAAGGTCACCATGACCTGCAGAGCCAGTTCAGTGTAAAGTTACATGAAGTGTG  
GTACCAGCAGAAGTCAGGCACCTCCCCAAAGATGGATTATGACACATCCAAAGTGGCTTCT  
GGAGTCCCTTATCGCTTCAGTGGCAGTGGGTCTGGGACCTCATACTCTCACAAATCAGCAGCA  
TGGAGGCTGAAGATGCTGCCACTTATTACTGCCAACAGTGGAGTAGTAACCCGCTCACGTTCCG  
TGCTGGGACCAAGCTGGAGCTGAAA

### AA Sequence

DIKLQQSGAELARPGASVKMSCKTSGYTFTRYTMHWVKQRPQGQGLEWIGYINPSRGYTNYNQKF  
KDKATLTTDKSSSTAYMQLSSLTSEDSAVYYCARYYDDHYCLDYWGQGTLLTVSSVEGGSGSG  
GSGSGGVDDIQLTQSPAIMASPGEKVTMTCRASSSVSYMNWYQQKSGTSPKRWIYDTSKVAS  
GVPYRFSGSGTSYSLTISSEAEADAATYYCQQWSSNPLTFGAGTKLELK

Fig. 2 A

**VH2**

DVQLVQSGAEVKKPGASVKVSCKASGYTATRYTMHWVRQAPGQGLEWIGYINPSR  
GYTNYAQKLQGRVTMTTDTSTAYMELSSLRSEDATYYCARYYDDHHCCLDYWG  
QGTTVTVSS

**VH3**

DVQLVQSGAEVKKPGASVKVSCKASGYTATRYTMHWVRQAPGQGLEWIGYINPSR  
GYTNYAQKLQGRVTMTTDTSTAYLQMNSLKTEDTAVYYCARYYDDHHCCLDYWG  
QGTTVTVSS

**VH5**

DVQLVQSGAEVKKPGASVKVSCKASGYTFTRYTMHWVRQAPGQGLEWIGYINPSR  
GYTNYADSVKGRFTITTDKSTSTAYMELSSLRSEDATYYCARYYDDHHCCLDYWG  
QGTTVTVSS

**VH7**

DVQLVQSGAEVKKPGASVKVSCKASGYTFTRYTMHWVRQAPGQGLEWIGYINPSR  
GYTNYNQKFQDRVTITTDKSTSTAYMELSSLRSEDATAVYYCARYYDDHHCCLDYWG  
QGTTVTVSS

Fig. 2 A (cont.)

**VL1**

DIQMTQSPSSLSASVGDRVTITCRASQSVSYMNWYQQKPGKAPKRWIYDT  
SKVASGVPARESGSGTDYSLTINSLEAEDAATYYCQQWSSNPLTFGGG  
TKVEIK

**VL2**

DIVLTQSPATLSLSPGERATLSCRASQSVSYMNWYQQKPGKAPKRWIYDT  
SKVASGVPARESGSGTDYSLTINSLEAEDAATYYCQQWSSNPLTFGGG  
TKVEIK

**VL3**

DIVLTQSPATLSLSPGERATLTCRASQSVSYMNWYQQKPGKAPKRWIYDT  
SKVASGVPARESGSGTDYSLTINSLEAEDAATYYCQQWSSNPLTFGGG  
TKVEIK

Fig. 2 B

**VH2**

GACGTCCAAC TGGTGCAGTCAGGGGCTGAAGTGAAAAACCTGGGGCCTCAGTGAAGGTGTCCTGC  
AAGGCTTCTGGCTACACCGCTACTAGGTACACGATGCAC TGGTAAGGCAGGCACCTGGACAGGGT  
CTGGAATGGATTGGATACATTAATCCTAGCCGTGGTTATACTAATTACGCACAGAAGTTGCAGGGC  
CGCGTCACAATGACTACAGACACTTCCACCAGCACAGCCTACATGGAAC TGAAGCAGCCTGCCGTTCT  
GAGGACACTGCAACCTATTACTGTGCAAGATAATTATGATGATCATTA CTGCTTGA CTACTACTGGGGC  
CAAGGCACCACGGTCACCGTCTCCTCA

**VH3**

GACGTCCAAC TGGTGCAGTCAGGGGCTGAAGTGAAAAACCTGGGGCCTCAGTGAAGGTGTCCTGC  
AAGGCTTCTGGCTACACCGCTACTAGGTACACGATGCAC TGGTAAGGCAGGCACCTGGACAGGGT  
CTGGAATGGATTGGATACATTAATCCTAGCCGTGGTTATACTAATTACGCACAGAAGTTGCAGGGC  
CGCGTCACAATGACTACAGACACTTCCACCAGCACAGCCTACCTGCAAA TGAACAGCCTGAAACT  
GAGGACACTGCAGTCTATTACTGTGCAAGATAATTATGATGATCATTA CTGCTTGA CTACTACTGGGGC  
CAAGGCACCACGGTCACCGTCTCCTCA

**VH5**

GACGTCCAAC TGGTGCAGTCAGGGGCTGAAGTGAAAAACCTGGGGCCTCAGTGAAGGTGTCCTGC  
AAGGCTTCTGGCTACACCTTTACTAGGTACACGATGCAC TGGTAAGGCAGGCACCTGGACAGGGT  
CTGGAATGGATTGGATACATTAATCCTAGCCGTGGTTATACTAATTACGCACAGCCTCAAGGGC  
CGCTTCACAATCACTACAGACAAATCCACCAGCACAGCCTACATGGAAC TGAAGCAGCCTGCCGTTCT  
GAGGACACTGCAACCTATTACTGTGCAAGATAATTATGATGATCATTA CTGCTTGA CTACTACTGGGGC  
CAAGGCACCACGGTCACCGTCTCCTCA

Fig. 2 B (cont.)

VH7

GACGTCCAAC TGGTG CAGTCAGGGGCTGAAGTGAAAAACCTGGGGCCTCAGTGAAGGTGTCCCTGC  
AAGGCTTCTGGCTACACCTTTACTAGGTACACGATGCACCTGGGTAAGGCAGGCACCTGGACAGGGT  
CTGGAATGGATTGGATACATTAACTAGCCGTGTTATACTAATTACAATCAGAAGTTC AAGGAC  
CGCGTCACAATCACTACAGACAATAATCCACGACACAGCCCTACATGGAACCTGAGCAGCCTGCCGTTCT  
GAGGACACTGCAGTCTATTACTGTGCAAGATATTATGATGATCATTA CTGCCCTTGACTACTGGGGC  
CAAGGCACCACGGTCACCGTCTCCTCA

Fig. 2 B (cont.)

**VL1**

GACATTGAGATGACCCAGTCTCCATCTAGCCTGTCTGCATCTGTCGGGACCGTGTCAACCATCACCTG  
TGCAGAGCCAGTCAAGTGTAAGTTACATGAACCTGGTACCAGCAGAAGCCGGGCAAGGCACCCCAA  
AGATGGATTATGACACATCCAAAGTGGCTTCTGGAGTCCCTGCTCGCTTCAGTGGCAGTGGGTCT  
GGGACCGACTACTCTCTCACAATCAACAGCTTGGAGGCTGAAGATGCTGCCACTTATTACTGCCAA  
CAGTGGAGTAGTAACCCGCTCACGTTCCGGTGGCGGGACCAAGGTGGAGATCAAA

**VL2**

GACATTGTACTGACCCAGTCTCCAGCAACTCTGTCTCTGTCTCCAGGGAGCGTGCCACCCCTGAGC  
TGCAGAGCCAGTCAAGTGTAAGTTACATGAACCTGGTACCAGCAGAAGCCGGGCAAGGCACCCCAA  
AGATGGATTATGACACATCCAAAGTGGCTTCTGGAGTCCCTGCTCGCTTCAGTGGCAGTGGGTCT  
GGGACCGACTACTCTCTCACAATCAACAGCTTGGAGGCTGAAGATGCTGCCACTTATTACTGCCAA  
CAGTGGAGTAGTAACCCGCTCACGTTCCGGTGGCGGGACCAAGGTGGAGATCAAA

**VL3**

GACATTGTACTGACCCAGTCTCCAGCAACTCTGTCTCTGTCTCCAGGGAGCGTGCCACCCCTGACC  
TGCAGAGCCAGTTCAAGTGTAAGTTACATGAACCTGGTACCAGCAGAAGCCGGGCAAGGCACCCCAA  
AGATGGATTATGACACATCCAAAGTGGCTTCTGGAGTCCCTGCTCGCTTCAGTGGCAGTGGGTCT  
GGGACCGACTACTCTCTCACAATCAACAGCTTGGAGGCTGAAGATGCTGCCACTTATTACTGCCAA  
CAGTGGAGTAGTAACCCGCTCACGTTCCGGTGGCGGGACCAAGGTGGAGATCAAA

## Fig. 2 C

**vH CDR1**

Wt anti-CD3  
VH2, 3  
VH5, 7

GYTFTRYTMH  
GYTATRYTMH  
GYTFTRYTMH

**vH CDR2**

WT anti-CD3,  
VH7  
VH5  
VH2, 3

YINPSRGYTNYNQKFKD  
YINPSRGYTNYADSVKG  
YINPSRGYTNYAQKLQG

**vH CDR3**

WT anti-CD3,  
VH2, 3, 5, 7

YYDDHYCLDY

**vK CDR1**

WT anti-CD3,  
VL3  
VL1, 2

RASSSVSYMN  
RASQSVSYMN

**vK CDR2**

WT anti-CD3,  
VL1, 2, 3

DTSKVAS

**vK CDR3**

WT anti-CD3,  
VL1, 2, 3

QQWSSNPLT



Fig. 2 D

**vH CDR1**

WT anti-CD3 GGCTACACCTTTACTAGGTACACGATG  
CAC

VH2, 3 GGCTACACCGCTACTAGGTACACGATG  
CAC

VH5, 7 GGCTACACCTTTACTAGGTACACGATG  
CAC

**vH CDR2**

WT anti-CD3,  
VH7 TACATTAATCCTAGCCGTGGTTATACT  
AATTACAATCAGAAGTTCAAGGAC

VH5 TACATTAATCCTAGCCGTGGTTATACT  
AATTACGCAGACAGCGTCAAGGGC

VH2, 3 TACATTAATCCTAGCCGTGGTTATACT  
AATTACGCACAGAAGTTGCAGGGC

**VH CDR3**

WT anti-CD3,  
VH2, 3,  
VH5, 7 TATTATGATGATCATTACTGCCTT  
GACTAC



**Fig. 2 D (cont.)****vK CDR1**

WT anti-CD3,  
VL3

AGAGCCAGTTCAAGTGTAAGTTACATG  
AAC

VL1, 2

AGAGCCAGTCAAAGTGTAAGTTACATG  
AAC

**vK CDR2**

WT anti-CD3,  
VL1-3

ACACATCCAAAGTGGCTTCT

**VK CDR3**

WT anti-CD3,  
VL1-3

CAACAGTGGAGTAGTAACCCGCTCACG

**Figure 3****A) anti-CD3 (VH2/VL1)**

GACGTCCAACCTGGTGCAGTCAGGGGGCTGAAGTGAAAAAACC  
TGGGGCCTCAGTGAAGGTGTCCTGCAAGGCTTCTGGCTACA  
CCGCTACTAGGTACACGATGCACTGGGTAAGGCAGGCACCT  
GGACAGGGTCTGGAATGGATTGGATACATTAATCCTAGCCG  
TGGTTATACTAATTACGCACAGAAGTTGCAGGGGCCGCGTCA  
CAATGACTACAGACACTTCCACCAGCACAGCCTACATGGAA  
CTGAGCAGCCTGCGTTCTGAGGACACTGCAACCTATTACTG  
TGCAAGATATTATGATGATCATTACTGCCTTGACTACTGGG  
GCCAAGGCACCACGGTCACCGTCTCCTCAGGCGAAGGTACT  
AGTACTGGTTCTGGTGGAAAGTGGAGGTTTCAGGTGGAGCAGA  
CGACATTCAGATGACCCAGTCTCCATCTAGCCTGTCTGCAT  
CTGTCGGGGACCGTGTCACCATCACCTGCAGAGCCAGTCAA  
AGTGTAAGTTACATGAACTGGTACCAGCAGAAGCCGGGGCAA  
GGCACCCAAAAGATGGATTTATGACACATCCAAAGTGGCTT  
CTGGAGTCCCTGCTCGCTTCAGTGGCAGTGGGTCTGGGACC  
GACTACTCTCTCACAATCAACAGCTTGGAGGCTGAAGATGC  
TGCCACTTATTACTGCCAACAGTGGAGTAGTAACCCGCTCA  
CGTTCGGTGGCGGGACCAAGGTGGAGATCAAA

**B) anti-CD3 (VH2/VL1)**

DVQLVQSGAEVKKPGASVKVSCKASGYTATRYTMHWVRQAP  
GQGLEWIGYINPSRGYTNYAQKLQGRVTMTTDTSTSTAYME  
LSSLRSEDATYYCARYYDDHYCLDYWGQGTTVTVSSGEGT  
STGSGGSGGSGGADDIQMTQSPSSLSASVGDRVTITCRASQ  
SVSYMNWYQQKPGKAPKRWIYDTSKVASGVPARESGSGSGT  
DYSLTINSLEAEDAATYYCQQWSSNPLTFGGGGTKVEIK

**Figure 3****C) anti-CD3 (VH2/VL2)**

GACGTCCAACCTGGTGCAGTCAGGGGCTGAAGTGAAAA-  
AACCTGGGGCCTCAGTGAAGGTGTCCTG-  
CAAGGCTTCTGGCTACACCGCTACTAGGTACACGATG-  
CACTGGGTAAAGGCAGGCACCTGGACAGGGTCTGGAATGGAT  
TGGATACATTAATCCTAGCCGTGGTTATACTAATTACGCA-  
CAGAAGTTGCAGGGCCGCGTCACAATGACTACAGA-  
CACTTCCACCAGCACAGCCTACATGGAAGTGAAG-  
CAGCCTGCGTTCTGAGGACACTGCAACCTATTACTGTGCAA  
GATATTATGATGATCATTACTGCCTTGACTACTGGGGC-  
CAAGGCACCACGGTCACCGTCTCCTCAGGCGAAGGTAC-  
TAGTACTGGTTCTGGTGGAAAGTGGAGGTTTCAGGTGGAGCA-  
GACGACATTGTACTGACCCAGTCTCCAGCAACTCTGTCTCT  
GTCTCCAGGGGAGCGTGCCACCCTGAGCTGCAGAGCCAGT-  
CAAAGTGTAAGTTACATGAAGTGGTACCAGCA-  
GAAGCCGGGCAAGGCACCCAAAAGATGGATTTATGACA-  
CATCCAAAGTGGCTTCTGGAGTCCCTGCTCGCTTCAGTGGC  
AGTGGGTCTGGGACCGACTACTCTCTCACAATCAA-  
CAGCTTGGAGGCTGAAGATGCTGCCACTTATTACTGCCAA-  
CAGTGGAGTAGTAACCCGCTCACGTTCGGTGGCGGGAC-  
CAAGGTGGAGATCAAA

**D) anti-CD3 (VH2/VL2)**

DVQLVQSGAEVKKPGASVKVSCKASGYTATRYTMHWVR-  
QAPGQGLEWIGYINPSRGYTN-  
AQKLQGRVTMTTDTSTSTAYMELSSLRSEDATYYCA-  
RYYDDHYCLDYWGQGTTVTVSSGEGTSTGSGGSGGSGGADD  
IVLTQSPATLSLSPGERATLSCRASQSVSYMNWYQQKPG-  
KAPKRWIYDTSKVASGVPARFSGSGSGTDYSLTINSLEAE-  
DAATYYCQQWSSNPLTFGGGTKVEIK

**Figure 3****E) anti-CD3 (VH2/VL3)**

GACGTCCAACCTGGTGCAGTCAGGGGCTGAAGTGAAAA-  
AACCTGGGGCCTCAGTGAAGGTGTCCTG-  
CAAGGCTTCTGGCTACACCGCTACTAGGTACACGATG-  
CACTGGGTAAGGCAGGCACCTGGACAGGGTCTGGAATGGAT  
TGGATACATTAATCCTAGCCGTGGTTATACTAATTACGCA-  
CAGAAGTTGCAGGGCCGCGTCACAATGACTACAGA-  
CACTTCCACCAGCACAGCCTACATGGAACCTGAG-  
CAGCCTGCGTTCTGAGGACACTGCAACCTATTACTGTGCAA  
GATATTATGATGATCATTACTGCCTTGACTACTGGGGC-  
CAAGGCACCACGGTCACCGTCTCCTCAGGCGAAGGTAC-  
TAGTACTGGTTCTGGTGGAAAGTGGAGGTTTCAGGTGGAGCA-  
GACGACATTGTACTGACCCAGTCTCCAGCAACTCTGTCTCT  
GTCTCCAGGGGAGCGTGCCACCCTGACCTGCAGAGC-  
CAGTTCAAGTGTAAGTTACATGAACTGGTACCAGCA-  
GAAGCCGGGCAAGGCACCCAAAAGATGGATTTATGACA-  
CATCCAAAGTGGCTTCTGGAGTCCCTGCTCGCTTCAGTGGC  
AGTGGGTCTGGGACCGACTACTCTCTCACAATCAA-  
CAGCTTGGAGGCTGAAGATGCTGCCACTTATTACTGCCAA-  
CAGTGGAGTAGTAACCCGCTCACGTTTCGGTGGCGGGAC-  
CAAGGTGGAGATCAAA

**F) anti-CD3 (VH2/VL3)**

DVQLVQSGAEVKKPGASVKVSCKASGYTATRYTMHWVR-  
QAPGQGLEWIGYINPSRGYTNV-  
AQKLQGRVTMTTDTSTSTAYMELSSLRSEDATYYCA-  
RYYDDHYCLDYWGQGTTVTVSSGEGTSTGSGGSGGGSGGADD  
IVLTQSPATLSLSPGERATLTCRASSSVSYMNWYQQKPG-  
KAPKRWIYDTSKVASGVPARFSGSGSGTDYSLTINSLEAE-  
DAATYYCQQWSSNPLTFGGGTKVEIK

**Figure 4****A) anti-CD3 (VH3/VL1)**

GACGTCCAACCTGGTGCAGTCAGGGGCTGAAGTGAAAAAACC  
TGGGGCCTCAGTGAAGGTGTCCTGCAAGGCTTCTGGCTACA  
CCGCTACTAGGTACACGATGCACTGGGTAAGGCAGGCACCT  
GGACAGGGTCTGGAATGGATTGGATACATTAATCCTAGCCG  
TGGTTATACTAATTACGCACAGAAGTTGCAGGGCCGCGTCA  
CAATGACTACAGACACTTCCACCAGCACAGCCTACCTGCAA  
ATGAACAGCCTGAAAACCTGAGGACACTGCAGTCTATTACTG  
TGCAAGATATTATGATGATCATTACTGCCTTGACTACTGGG  
GCCAAGGCACCACGGTCACCGTCTCCTCAGGCGAAGGTACT  
AGTACTGGTTCTGGTGGAAAGTGGAGGTTTCAGGTGGAGCAGA  
CGACATTCAGATGACCCAGTCTCCATCTAGCCTGTCTGCAT  
CTGTCGGGGACCGTGTCACCATCACCTGCAGAGCCAGTCAA  
AGTGTAAGTTACATGAACTGGTACCAGCAGAAGCCGGGCAA  
GGCACCCAAAAGATGGATTTATGACACATCCAAAGTGGCTT  
CTGGAGTCCCTGCTCGCTTCAGTGGCAGTGGGTCTGGGACC  
GACTACTCTCTCACAAATCAACAGCTTGGAGGCTGAAGATGC  
TGCCACTTATTACTGCCAACAGTGGAGTAGTAACCCGCTCA  
CGTTCGGTGGCGGGACCAAGGTGGAGATCAAA

**B) anti-CD3 (VH3/VL1)**

DVQLVQSGAEVKKPGASVKVSCKASGYTATRYTMHWVR-  
QAPGQGLEWIGYINPSRGYTNV-  
AQKLQGRVTMTTDTSTSTAYLQMNSLKTEDTAVYYCARYYDD-  
HYCLDYWGQGTTVTVSSGEGTSTGSGGSGGSGGADDIQMTQSP  
SSLSASVGDRTITCRASQSVSYMNWYQQKPG-  
KAPKRWIYDTSKVASGVPARFSGSGSGTDYSLTINSLEAE-  
DAATYYCQQWSSNPLTFGGGTKVEIK



**Figure 4****C) anti-CD3 (VH3/VL2)**

GACGTCCAACCTGGTGCAGTCAGGGGCTGAAGTGAAAAAACC  
TGGGGCCTCAGTGAAGGTGTCCTGCAAGGCTTCTGGCTACA  
CCGCTACTAGGTACACGATGCACTGGGTAAGGCAGGCACCT  
GGACAGGGTCTGGAATGGATTGGATACATTAATCCTAGCCG  
TGGTTATACTAATTACGCACAGAAGTTGCAGGGGCCGCGTCA  
CAATGACTACAGACACTTCCACCAGCACAGCCTACCTGCAA  
ATGAACAGCCTGAAAACCTGAGGACACTGCAGTCTATTACTG  
TGCAAGATATTATGATGATCATTACTGCCTTGACTACTGGG  
GCCAAGGCACCACGGTCACCGTCTCCTCAGGCGAAGGTACT  
AGTACTGGTTCTGGTGGAAAGTGGAGGTTTCAGGTGGAGCAGA  
CGACATTGTACTGACCCAGTCTCCAGCAACTCTGTCTCTGT  
CTCCAGGGGGAGCGTGCCACCCTGAGCTGCAGAGCCAGTCAA  
AGTGTAAGTTACATGAACTGGTACCAGCAGAAGCCGGGGCAA  
GGCACCCAAAAGATGGATTTATGACACATCCAAAGTGGCTT  
CTGGAGTCCCTGCTCGCTTCAGTGGCAGTGGGTCTGGGACC  
GACTACTCTCTCACAATCAACAGCTTGGAGGCTGAAGATGC  
TGCCACTTATTACTGCCAACAGTGGAGTAGTAACCCGCTCA  
CGTTCGGTGGCGGGACCAAGGTGGAGATCAAA

**D) anti-CD3 (VH3/VL2)**

DVQLVQSGAEVKKPGASVKVSCKASGYTATRYTMHWVRQAP  
GQGLEWIGYINPSRGYTNYAQKLQGRVTMTTDTSTSTAYLQ  
MNSLKTEDTAVYYCARYYDDHYCLDYWGQGTTVTVSSGEGT  
STGSGGSGGSGGADDIVLTQSPATLSLSPGERATLSCRASQ  
SVSYMNWYQQKPGKAPKRWIYDTSKVASGVPARFSGSGSGT  
DYSLTINSLEAEDAATYYCQQWSSNPLTFGGGGTKVEIK

**Figure 4****E) anti-CD3 (VH3/VL3)**

GACGTCCAACCTGGTGCAGTCAGGGGCTGAAGTGAAAA-  
AACCTGGGGCCTCAGTGAAGGTGTCCTG-  
CAAGGCTTCTGGCTACACCGCTACTAGGTACACGATG-  
CACTGGGTAAGGCAGGCACCTGGACAGGGTCTGGAATGGAT  
TGGATACATTAATCCTAGCCGTGGTTATACTAATTACGCA-  
CAGAAGTTGCAGGGCCGCGTCACAATGACTACAGA-  
CACTTCCACCAGCACAGCCTACCTGCAAATGAACAGCCT-  
GAAAACCTGAGGACACTGCAGTCTATTACTGTGCAAGATATT  
ATGATGATCATTACTGCCTTGACTACTGGGGCCAAGGCAC-  
CACGGTCACCGTCTCCTCAGGCGAAGGTACTAG-  
TACTGGTTCTGGTGGGAAGTGGAGGTTTCAGGTGGAGCAGAC-  
GACATTGTACTGACCCAGTCTCCAGCAACTCTGTCTCTGTC  
TCCAGGGGAGCGTGCCACCCTGACCTGCAGAGCCAGTT-  
CAAGTGTAAGTTACATGAACTGGTACCAGCAGAAGCCGGG-  
CAAGGCACCCAAAAGATGGATTTATGACACATCCA-  
AAGTGGCTTCTGGAGTCCCTGCTCGCTTCAGTGGCAGTGGG  
TCTGGGACCGACTACTCTCTCACAATCAACAGCTTG-  
GAGGCTGAAGATGCTGCCACTTATTACTGCCAACAGTG-  
GAGTAGTAACCCGCTCACGTTCTGGTGGCGGGACCAAGGTG-  
GAGATCAAA

**F) anti-CD3 (VH3/VL3)**

DVQLVQSGAEVKKPGASVKVSCKASGYTATRYTMHWVR-  
QAPGQGLEWIGYINPSRGYTNV-  
AQKLQGRVTMTTDTSTSTAYLQMNSLKTEDTAVYYCA-  
RYYDDHYCLDYWGQGTTVTVSSGEGTSTGSGGSGGSGGADD  
IVLTQSPATLSLSPGERATLTCRASSSVSYMNWYQQKPG-  
KAPKRWIYDTSKVASGVPARFSGSGSGTDYSLTINSLEAE-  
DAATYYCQQWSSNPLTFGGGGTKVEIK



**Figure 5****A) CD3 (VH5/VL1)**

GACGTCCAACCTGGTGCAGTCAGGGGCTGAAGTGAAAAAACC  
TGGGGCCTCAGTGAAGGTGTCCTGCAAGGCTTCTGGCTACA  
CCTTTACTAGGTACACGATGCACTGGGTAAGGCAGGCACCT  
GGACAGGGTCTGGAATGGATTGGATACATTAATCCTAGCCG  
TGGTTATACTAATTACGCAGACAGCGTCAAGGGCCGCTTCA  
CAATCACTACAGACAAATCCACCAGCACAGCCTACATGGAA  
CTGAGCAGCCTGCGTTCTGAGGACACTGCAACCTATTACTG  
TGCAAGATATTATGATGATCATTACTGCCTTGACTACTGGG  
GCCAAGGCACCACGGTCACCGTCTCCTCAGGCGAAGGTACT  
AGTACTGGTTCTGGTGGAAAGTGGAGGTTTCAGGTGGAGCAGA  
CGACATTCAGATGACCCAGTCTCCATCTAGCCTGTCTGCAT  
CTGTCGGGGACCGTGTCACCATCACCTGCAGAGCCAGTCAA  
AGTGTAAGTTACATGAACTGGTACCAGCAGAAGCCGGGCAA  
GGCACCCAAAAGATGGATTTATGACACATCCAAAGTGGCTT  
CTGGAGTCCCTGCTCGCTTCAGTGGCAGTGGGTCTGGGACC  
GACTACTCTCTCACAAATCAACAGCTTGGAGGCTGAAGATGC  
TGCCACTTATTACTGCCAACAGTGGAGTAGTAACCCGCTCA  
CGTTCGGTGGCGGGACCAAGGTGGAGATCAAA

**B) CD3 (VH5/VL1)**

DVQLVQSGAEVKKPGASVKVSCKASGYTFTRYTMHWVRQAP  
GQGLEWIGYINPSRGYTNADSVKGRFTITTDKSTSTAYME  
LSSLRSEDATYYCARYYDDHYCLDYWGQGTTVTVSSGEGT  
STGSGGSGGSGGADDIQMTQSPSSLSASVGDRVITICRASQ  
SVSYMNWYQQKPGKAPKRWIYDTSKVASGVPARFSGSGSGT  
DYSLTINSLEAEDAATYYCQQWSSNPLTFGGGGTKVEIK

**Figure 5****C) anti-CD3 (VH5/VL2)**

GACGTCCAACCTGGTGCAGTCAGGGGCTGAAGTGAAAAAACC  
TGGGGCCTCAGTGAAGGTGTCCTGCAAGGCTTCTGGCTACA  
CCTTTACTAGGTACACGATGCACTGGGTAAGGCAGGCACCT  
GGACAGGGTCTGGAATGGATTGGATACATTAATCCTAGCCG  
TGGTTATACTAATTACGCAGACAGCGTCAAGGGCCGCTTCA  
CAATCACTACAGACAAATCCACCAGCACAGCCTACATGGAA  
CTGAGCAGCCTGCGTTCTGAGGACACTGCAACCTATTACTG  
TGCAAGATATTATGATGATCATTACTGCCTTGACTACTGGG  
GCCAAGGCACCACGGTCACCGTCTCCTCAGGCGAAGGTACT  
AGTACTGGTTCTGGTGGAAAGTGGAGGTTTCAGGTGGAGCAGA  
CGACATTGTACTGACCCAGTCTCCAGCAACTCTGTCTCTGT  
CTCCAGGGGAGCGTGCCACCCTGAGCTGCAGAGCCAGTCAA  
AGTGTAAGTTACATGAACTGGTACCAGCAGAAGCCGGGCAA  
GGCACCCAAAAGATGGATTTATGACACATCCAAAGTGGCTT  
CTGGAGTCCCTGCTCGCTTCAGTGGCAGTGGGTCTGGGACC  
GACTACTCTCTCACAATCAACAGCTTGGAGGCTGAAGATGC  
TGCCACTTATTACTGCCAACAGTGGAGTAGTAACCCGCTCA  
CGTTCGGTGGCGGGACCAAGGTGGAGATCAAA

**D) anti-CD3 (VH5/VL2)**

DVQLVQSGAEVKKPGASVKVSCKASGYTFTRYTMHWVRQAP  
GQGLEWIGYINPSRGYTNYSVKGRTITTDKSTSTAYME  
LSSLRSEDATYYCARYYDDHYCLDYWGQGTTVTVSSGEGT  
STGSGGSGGSGGADDIVLTQSPATLSLSPGERATLSCRASQ  
SVSYMNWYQQKPGKAPKRWIYDTSKVASGVPARFSGSGSGT  
DYSLTINSLEAEDAATYYCQQWSSNPLTFGGGGTKVEIK

**Figure 5****E) anti-CD3 (VH5/VL3)**

GACGTCCAACCTGGTGCAGTCAGGGGCTGAAGTGAAAA-  
AACCTGGGGCCTCAGTGAAGGTGTCCTG-  
CAAGGCTTCTGGCTACACCTTTACTAGGTACACGATG-  
CACTGGGTAAGGCAGGCACCTGGACAGGGTCTGGAATGGAT  
TGGATACATTAATCCTAGCCGTGGTTATACTAATTACG-  
CAGACAGCGTCAAGGGCCGCTTCACAATCACTACAGACA-  
AATCCACCAGCACAGCCTACATGGAAGTGAAG-  
CAGCCTGCGTTCTGAGGACACTGCAACCTATTACTGTGCAA  
GATATTATGATGATCATTACTGCCTTGACTACTGGGGC-  
CAAGGCACCACGGTCACCGTCTCCTCAGGCGAAGGTAC-  
TAGTACTGGTTCTGGTGGGAAGTGGAGGTTTCAGGTGGAG-  
CAGACGACATTGTACTGACCCAGTCTCCAGCAACTCTGTCT  
CTGTCTCCAGGGGAGCGTGCCACCCTGACCTGCAGAGC-  
CAGTTCAAGTGTAAGTTACATGAACTGGTACCAGCA-  
GAAGCCGGGCAAGGCACCCAAAAGATGGATTTATGACA-  
CATCCAAAGTGGCTTCTGGAGTCCCTGCTCGCTTCAGTGGC  
AGTGGGTCTGGGACCGACTACTCTCTCACAATCAA-  
CAGCTTGGAGGCTGAAGATGCTGCCACTTATTACTGC-  
CAACAGTGGAGTAGTAACCCGCTCACGTTTCGGTGGCGG-  
GACCAAGGTGGAGATCAAA

**F) anti-CD3 (VH5/VL3)**

DVQLVQSGAEVKKPGASVKVSCKASGYTFTRYTMHWVR-  
QAPGQGLEWIGYINPSRGYTN-  
ADSVKGRFTITTDKSTSTAYMELSSLRSEDATYYCA-  
RYYDDHYCLDYWGQGT VTVSSGEGTSTGSGGSGGGSGGADD  
IVLTQSPATLSLSPGERATLTCRASSSVSYMNWYQQKPG-  
KAPKRWIYDTSKVASGVPARFSGSGSGTDYSLTINSLEAE-  
DAATYYCQQWSSNPLTFGGGTKVEIK

**Figure 6****A) anti-CD3 (VH7/VL1)**

GACGTCCAACCTGGTGCAGTCAGGGGCTGAAGTGAAAAAACC  
TGGGGCCTCAGTGAAGGTGTCCTGCAAGGCTTCTGGCTACA  
CCTTTACTAGGTACACGATGCACTGGGTAAGGCAGGCACCT  
GGACAGGGTCTGGAATGGATTGGATACATTAATCCTAGCCG  
TGGTTATACTAATTACAATCAGAAGTTCAAGGACCGCGTCA  
CAATCACTACAGACAAATCCACCAGCACAGCCTACATGGAA  
CTGAGCAGCCTGCGTTCTGAGGACACTGCAGTCTATTACTG  
TGCAAGATATTATGATGATCATTACTGCCTTGACTACTGGG  
GCCAAGGCACCACGGTCACCGTCTCCTCAGGCGAAGGTACT  
AGTACTGGTTCTGGTGGAAAGTGGAGGTTTCAGGTGGAGCAGA  
CGACATTCAGATGACCCAGTCTCCATCTAGCCTGTCTGCAT  
CTGTCGGGGACCGTGTCACCATCACCTGCAGAGCCAGTCAA  
AGTGTAAGTTACATGAACTGGTACCAGCAGAAGCCGGGCAA  
GGCACCCAAAAGATGGATTTATGACACATCCAAAGTGGCTT  
CTGGAGTCCCTGCTCGCTTCAGTGGCAGTGGGTCTGGGACC  
GACTACTCTCTCACAATCAACAGCTTGGAGGCTGAAGATGC  
TGCCACTTATTACTGCCAACAGTGGAGTAGTAACCCGCTCA  
CGTTCGGTGGCGGGACCAAGGTGGAGATCAAA

**B) anti-CD3 (VH7/VL1)**

DVQLVQSGAEVKKPGASVKVSCKASGYTFTRYTMHWVR-  
QAPGQGLEWIGYINPSRGYT-  
NYNQKFKDRVITITDKSTSTAYMELSSLRSED TAVYYCA-  
RYYDDHYCLDYWGQGTTVTVSSGEGTSTGSGGSGGSGGADD  
IQMTQSPSSLSASVGDRTITCRASQSVSYMNWYQQKPG-  
KAPKRWIYDTSKVASGVPARFSGSGSGTDYSLTINSLEAE-  
DAATYYCQQWSSNPLTFGGGTKVEIK

**Figure 6****C) anti-CD3 (VH7/VL2)**

GACGTCCAACCTGGTGCAGTCAGGGGCTGAAGTGAAAAAACC  
TGGGGCCTCAGTGAAGGTGTCCTGCAAGGCTTCTGGCTACA  
CCTTTACTAGGTACACGATGCACTGGGTAAGGCAGGCACCT  
GGACAGGGTCTGGAATGGATTGGATACATTAATCCTAGCCG  
TGGTTATACTAATTACAATCAGAAGTTCAAGGACCGCGTCA  
CAATCACTACAGACAAATCCACCAGCACAGCCTACATGGAA  
CTGAGCAGCCTGCGTTCTGAGGACACTGCAGTCTATTACTG  
TGCAAGATATTATGATGATCATTACTGCCTTGACTACTGGG  
GCCAAGGCACCACGGTCACCGTCTCCTCAGGCGAAGGTACT  
AGTACTGGTTCTGGTGGAAAGTGGAGGTTTCAGGTGGAGCAGA  
CGACATTGTACTGACCCAGTCTCCAGCAACTCTGTCTCTGT  
CTCCAGGGGAGCGTGCCACCCTGAGCTGCAGAGCCAGTCAA  
AGTGTAAGTTACATGAACTGGTACCAGCAGAAGCCGGGCAA  
GGCACCCAAAAGATGGATTTATGACACATCCAAAGTGGCTT  
CTGGAGTCCCTGCTCGCTTCAGTGGCAGTGGGTCTGGGACC  
GACTACTCTCTCACAAATCAACAGCTTGGAGGCTGAAGATGC  
TGCCACTTATTACTGCCAACAGTGGAGTAGTAACCCGCTCA  
CGTTCGGTGGCGGGACCAAGGTGGAGATCAAA

**D) anti-CD3 (VH7/VL2)**

DVQLVQSGAEVKKPGASVKVSCKASGYTFTRYTMHWVR-  
QAPGQGLEWIGYINPSRGYT-  
NYNQKFKDRVITITDKSTSTAYMELSSLRSED TAVYYCA-  
RYYDDHYCLDYWGQGTTVTVSSGEGTSTGSGGSGGSGGADD  
IVLTQSPATLSLSPGERATLSCRASQSVSYMNWYQQKPG-  
KAPKRWIYDTSKVASGVPARFSGSGSGTDYSLTINSLEAE-  
DAATYYCQQWSSNPLTFGGGTKVEIK



**Figure 6****E) anti-CD3 (VH7/VL3)**

GACGTCCAACCTGGTGCAGTCAGGGGCTGAAGTGAAAA-  
AACCTGGGGCCTCAGTGAAGGTGTCCTG-  
CAAGGCTTCTGGCTACACCTTTACTAGGTACACGATG-  
CACTGGGTAAGGCAGGCACCTGGACAGGGTCTGGAATGGAT  
TGGATACATTAATCCTAGCCGTGGTTATACTAATTACAAT-  
CAGAAGTTCAAGGACCGCGTCACAATCACTACAGACA-  
AATCCACCAGCACAGCCTACATGGAACTGAG-  
CAGCCTGCGTTCTGAGGACACTGCAGTCTATTACTGTGCAA  
GATATTATGATGATCATTACTGCCTTGACTACTGGGGC-  
CAAGGCACCACGGTCACCGTCTCCTCAGGCGAAGGTAC-  
TAGTACTGGTTCTGGTGGAAAGTGGAGGTTTCAGGTGGAGCA-  
GACGACATTGTACTGACCCAGTCTCCAGCAACTCTGTCTCT  
GTCTCCAGGGGAGCGTGCCACCCTGACCTGCAGAGC-  
CAGTTCAAGTGTAAGTTACATGAACTGGTACCAGCA-  
GAAGCCGGGCAAGGCACCCAAAAGATGGATTTATGACA-  
CATCCAAAGTGGCTTCTGGAGTCCCTGCTCGCTTCAGTGGC  
AGTGGGTCTGGGACCGACTACTCTCTCACAATCAA-  
CAGCTTGGAGGCTGAAGATGCTGCCACTTATTACTGCCAA-  
CAGTGGAGTAGTAACCCGCTCACGTTCCGGTGGCGGGAC-  
CAAGGTGGAGATCAAA

**F) anti-CD3 (VH7/VL3)**

DVQLVQSGAEVKKPGASVKVSCKASGYTFTRYTMHWVR-  
QAPGQGLEWIGYINPSRGYT-  
NYNQKFKDRVITTDKSTSTAYMELSSLRSEDVAVYYCA-  
RYYDDHYCLDYWGQGTTVTVSSGEGTSTGSGGSGGGSGGADD  
IVLTQSPATLSLSPGERATLTCRASSSVSYMNWYQQKPG-  
KAPKRWIYDTSKVASGVPARFSGSGSGTDYSLTINSLEAE-  
DAATYYCQQWSSNPLTFGGGGTKVEIK

Figure 7A

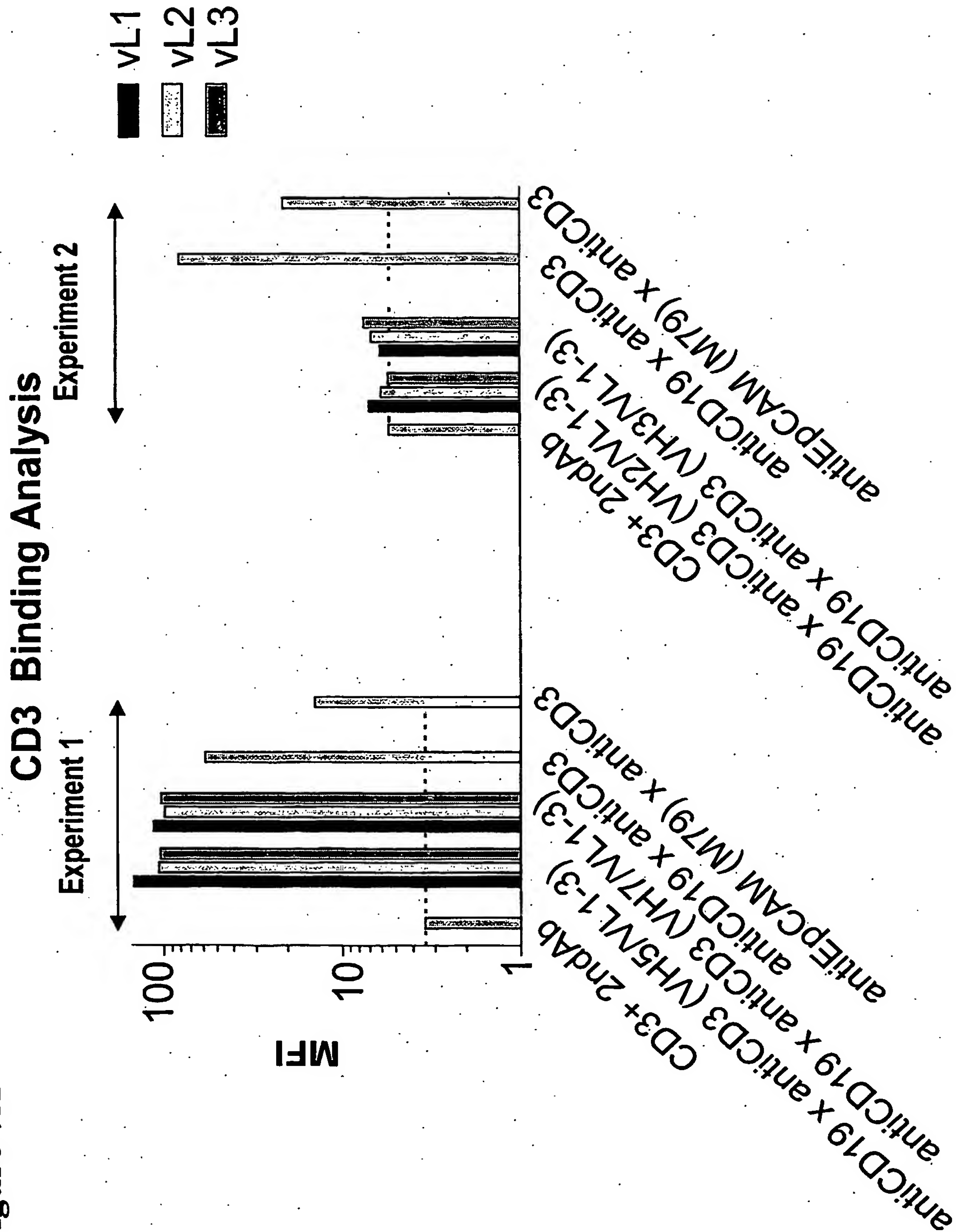




Figure 7B

CD19 Binding Analysis

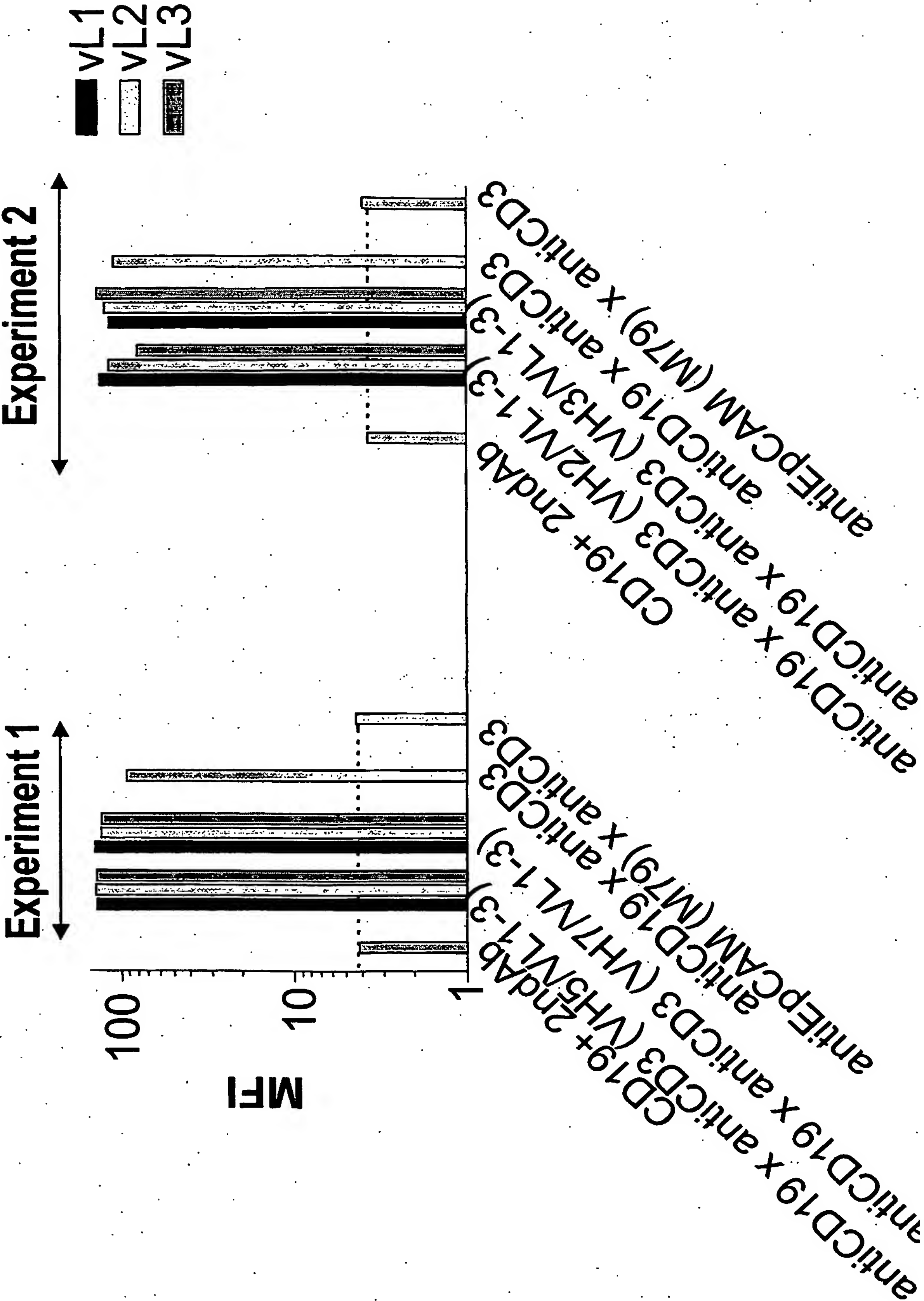


Figure 8

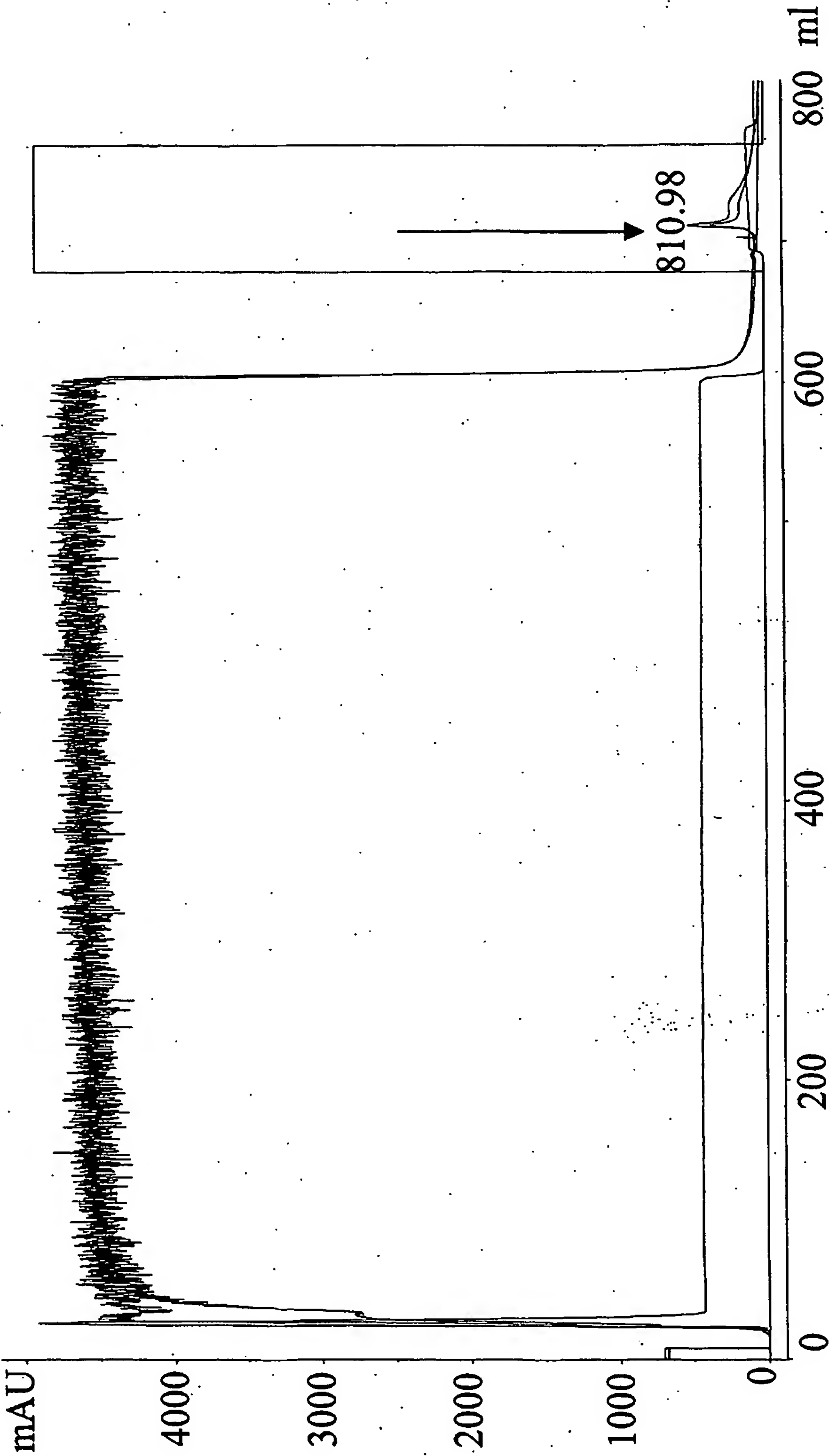
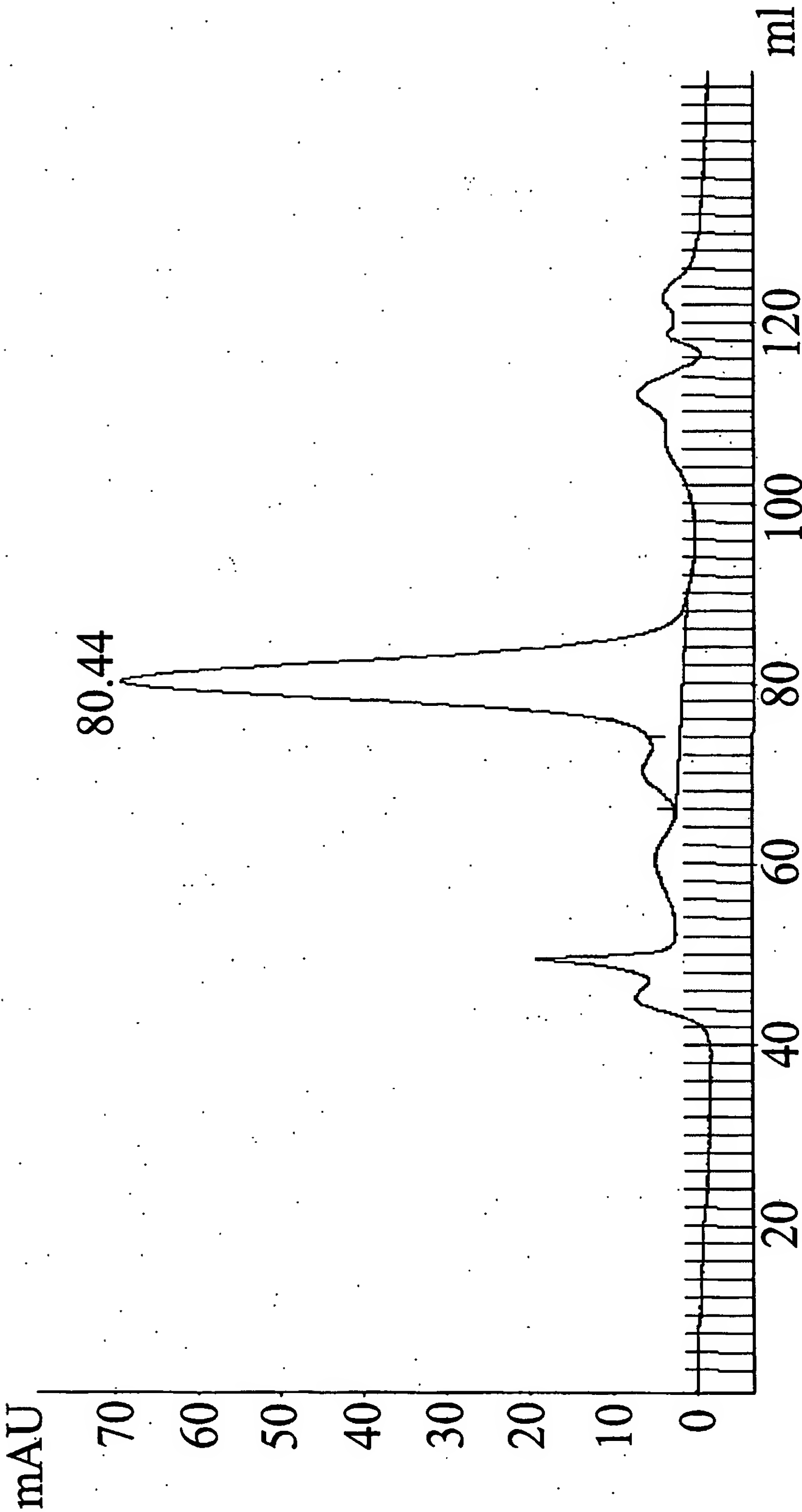


Figure 9



Figure 10



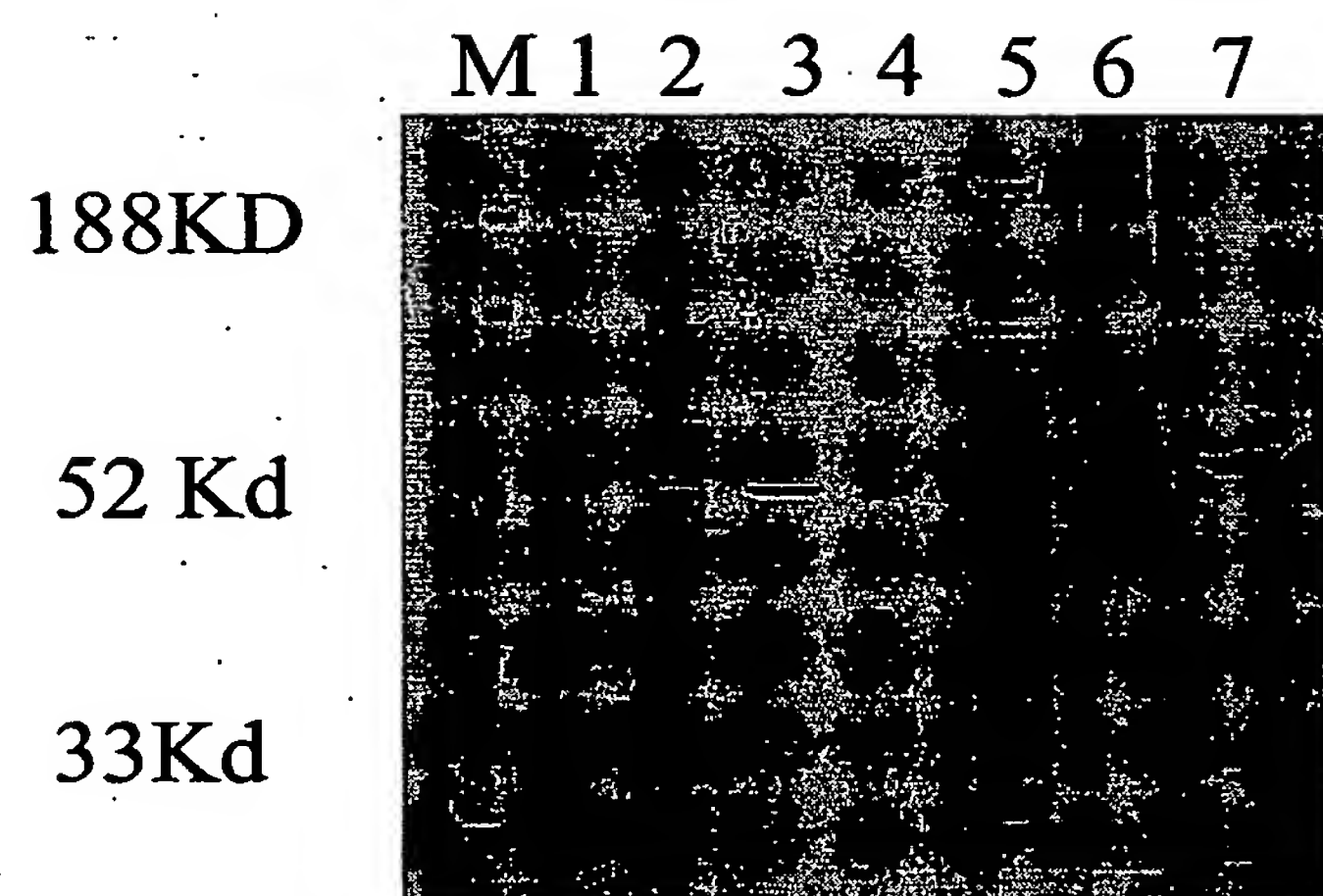
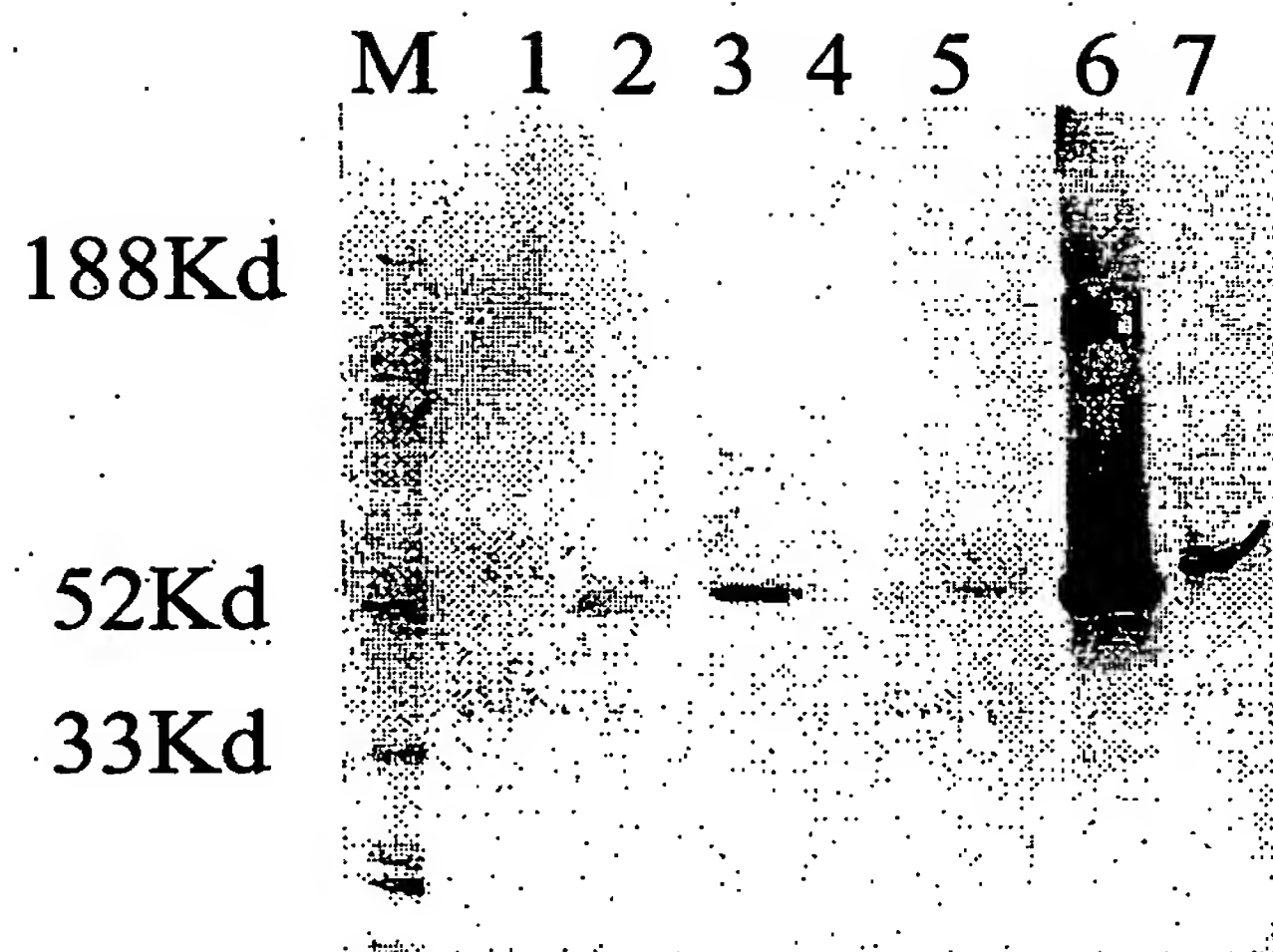
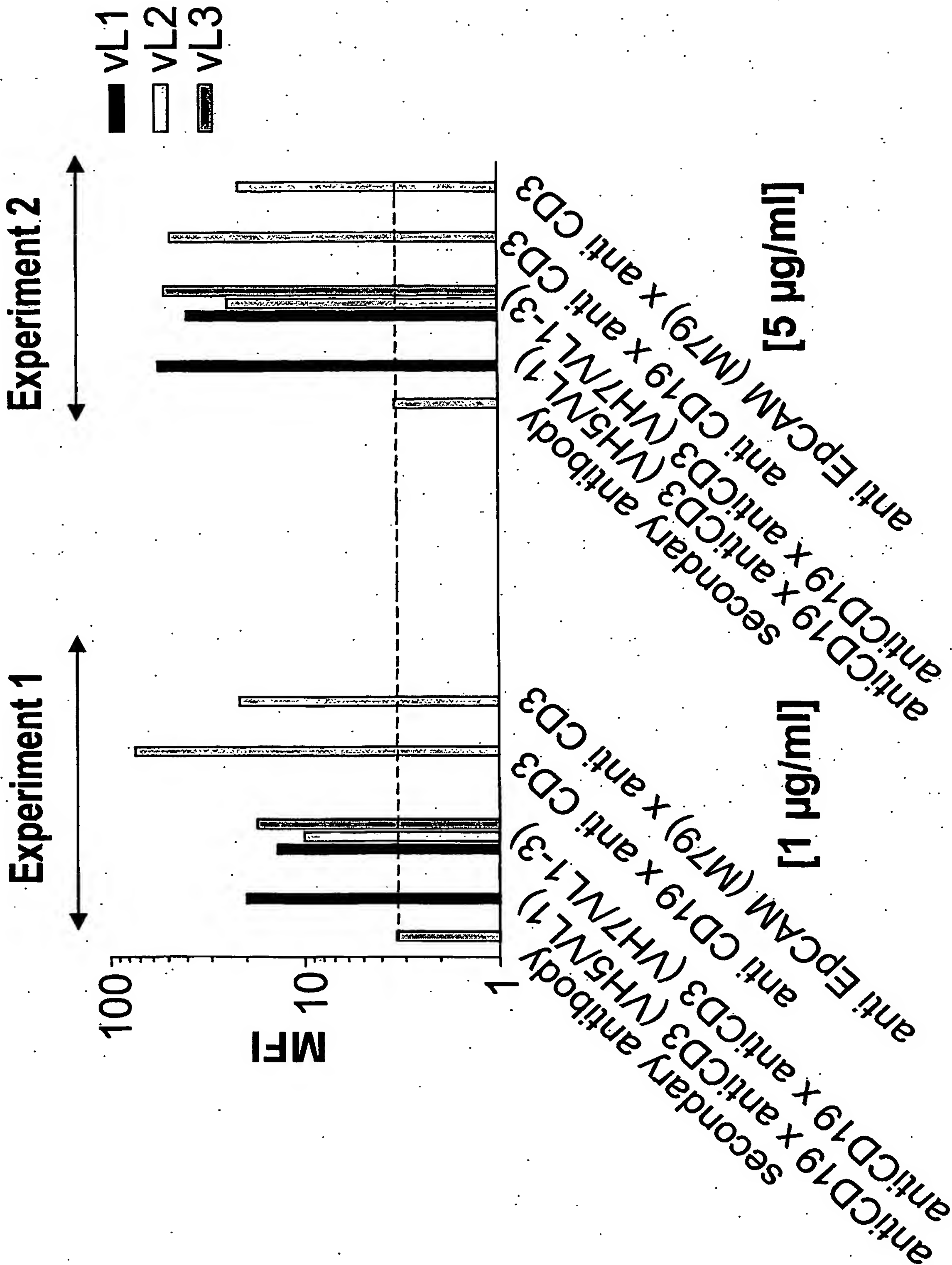
**Figure 11****A)****B)**

Figure 12A

Binding on CD3



## Figure 12B

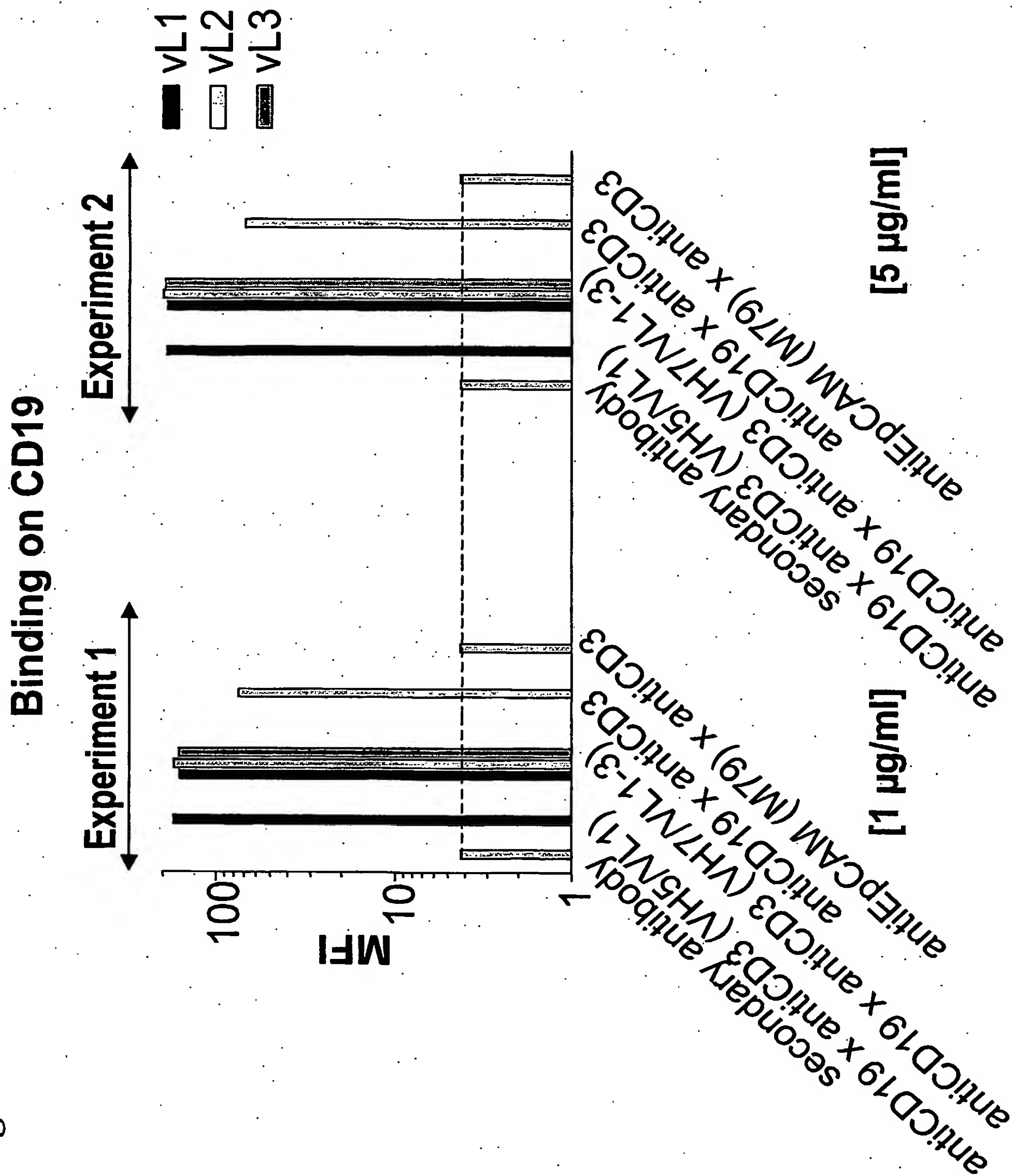




Figure 13

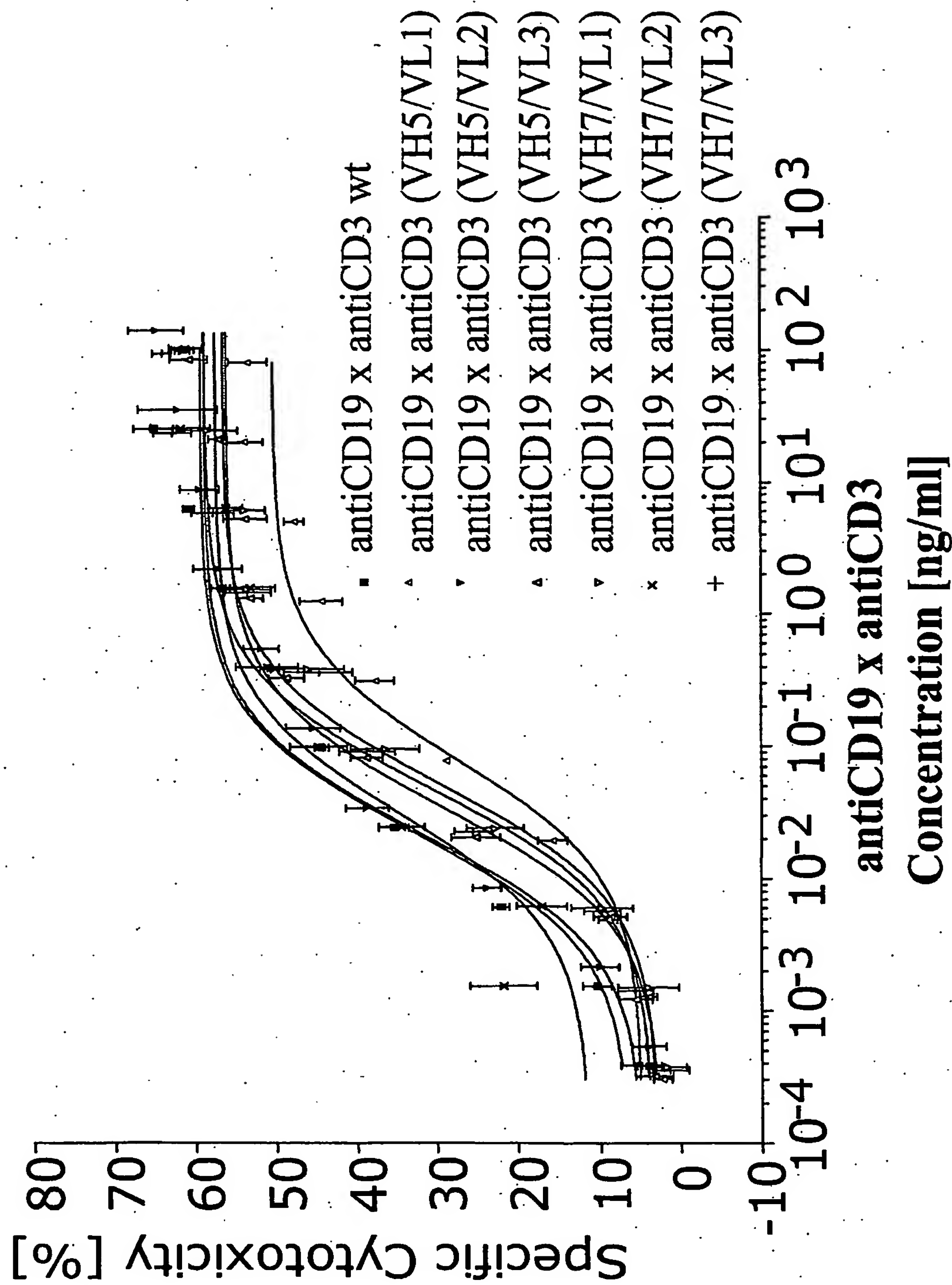
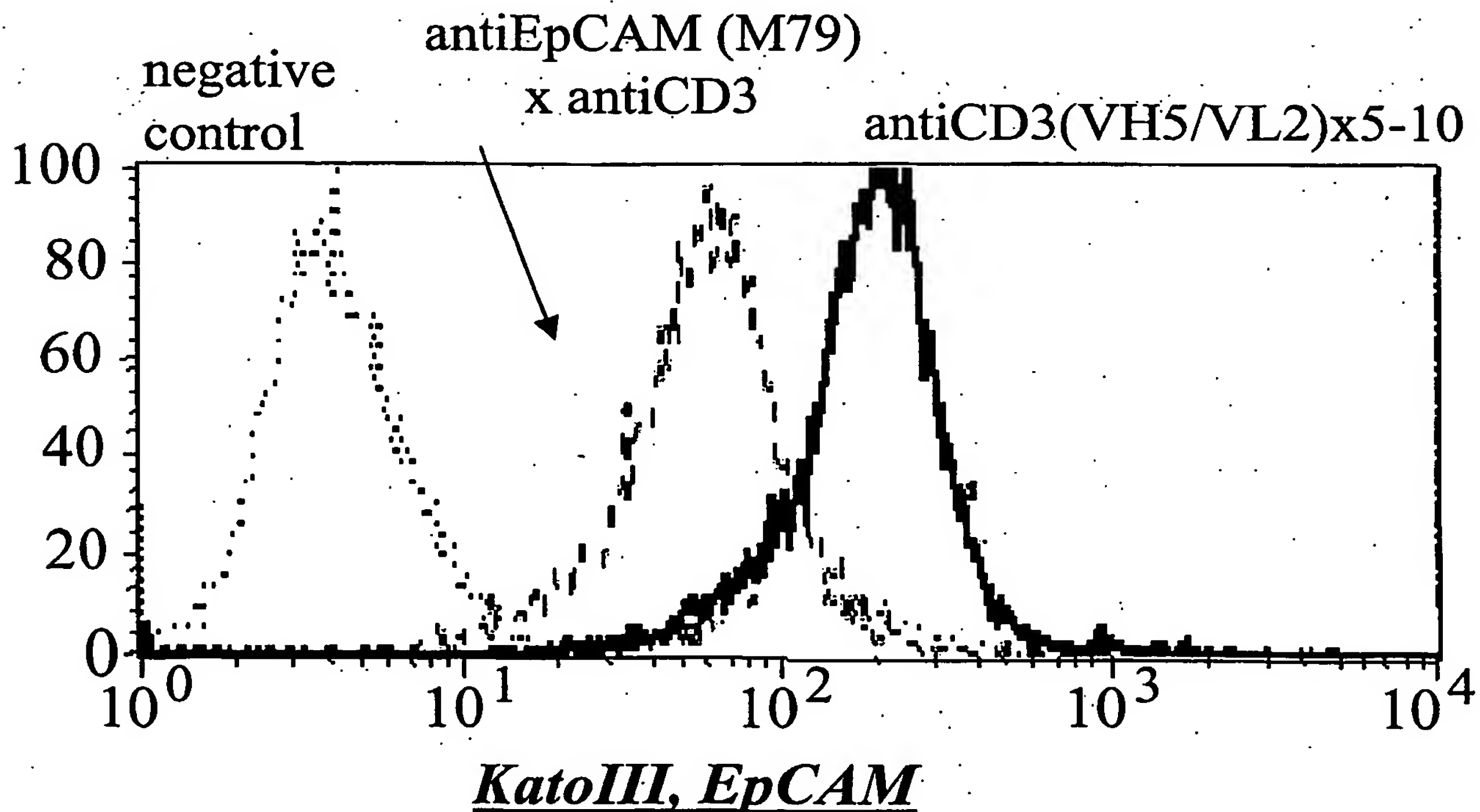
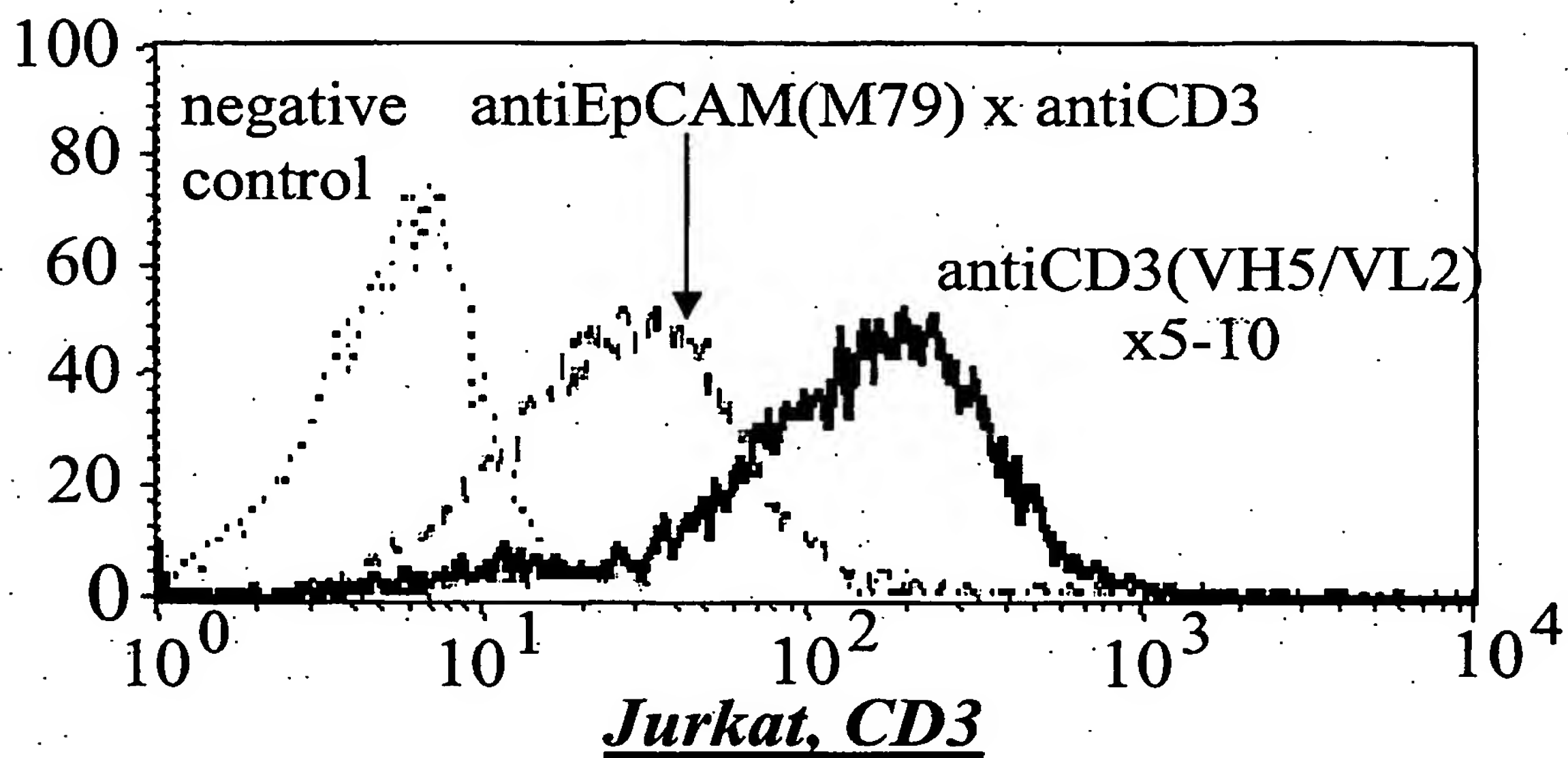
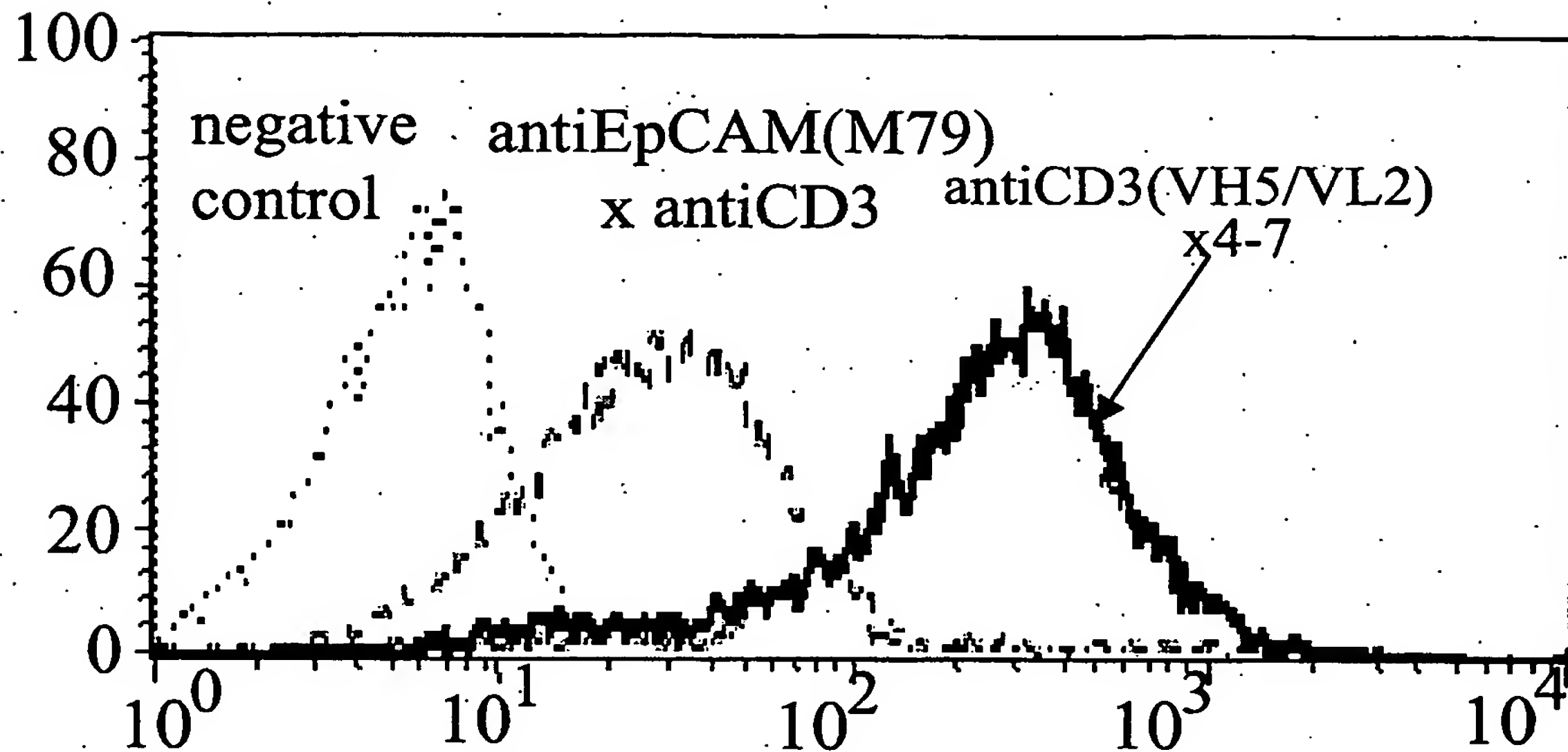
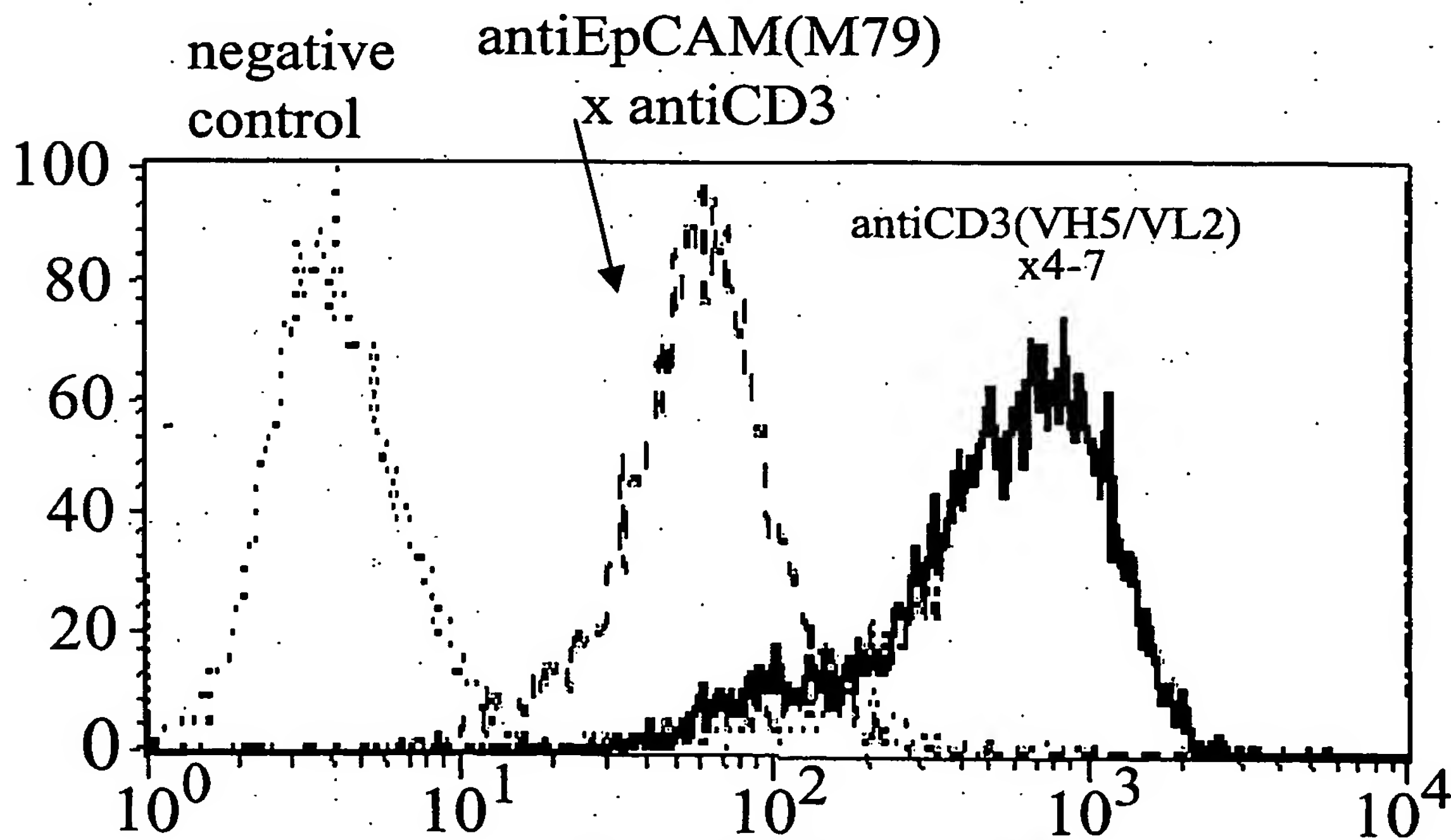


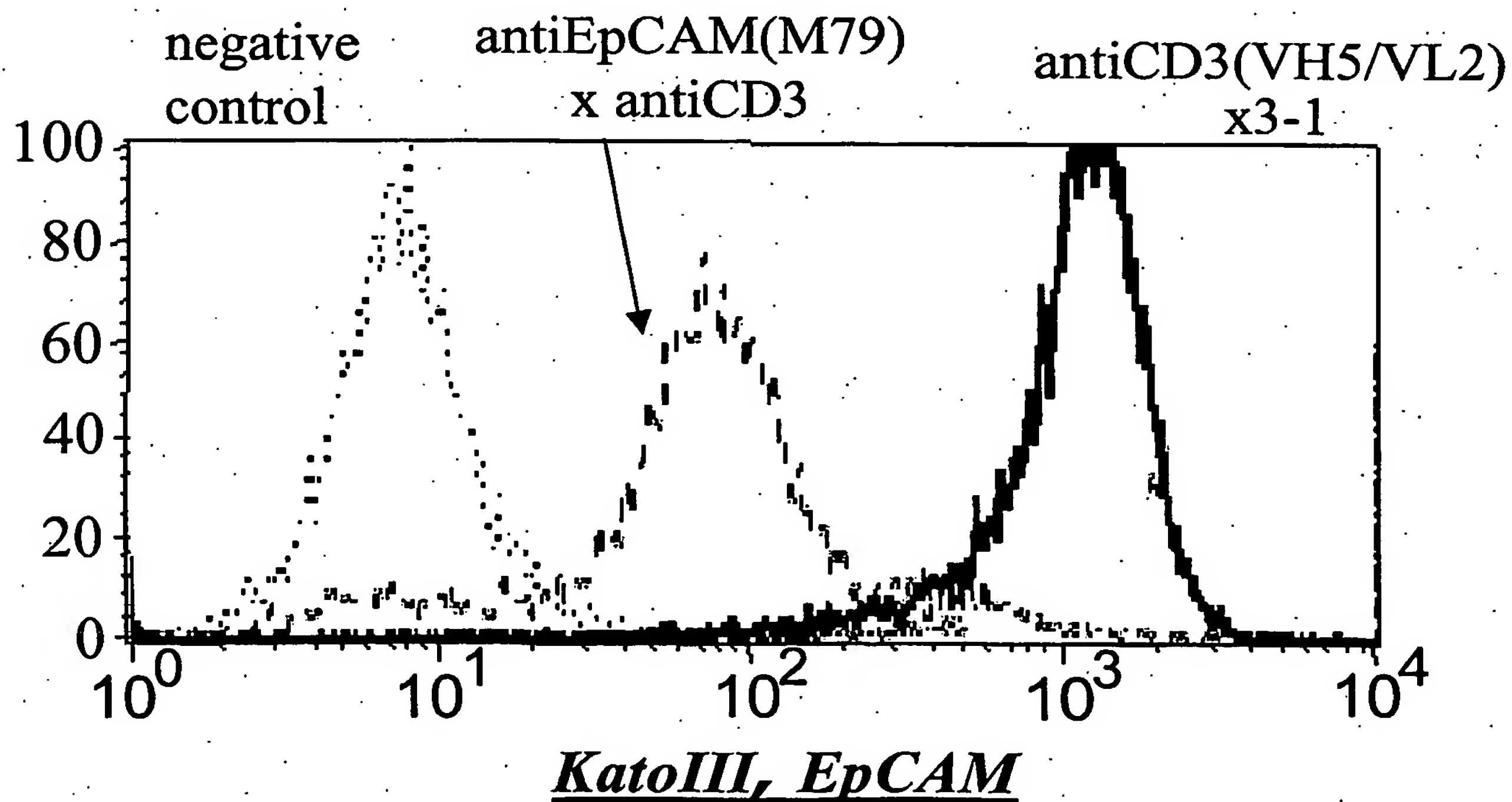
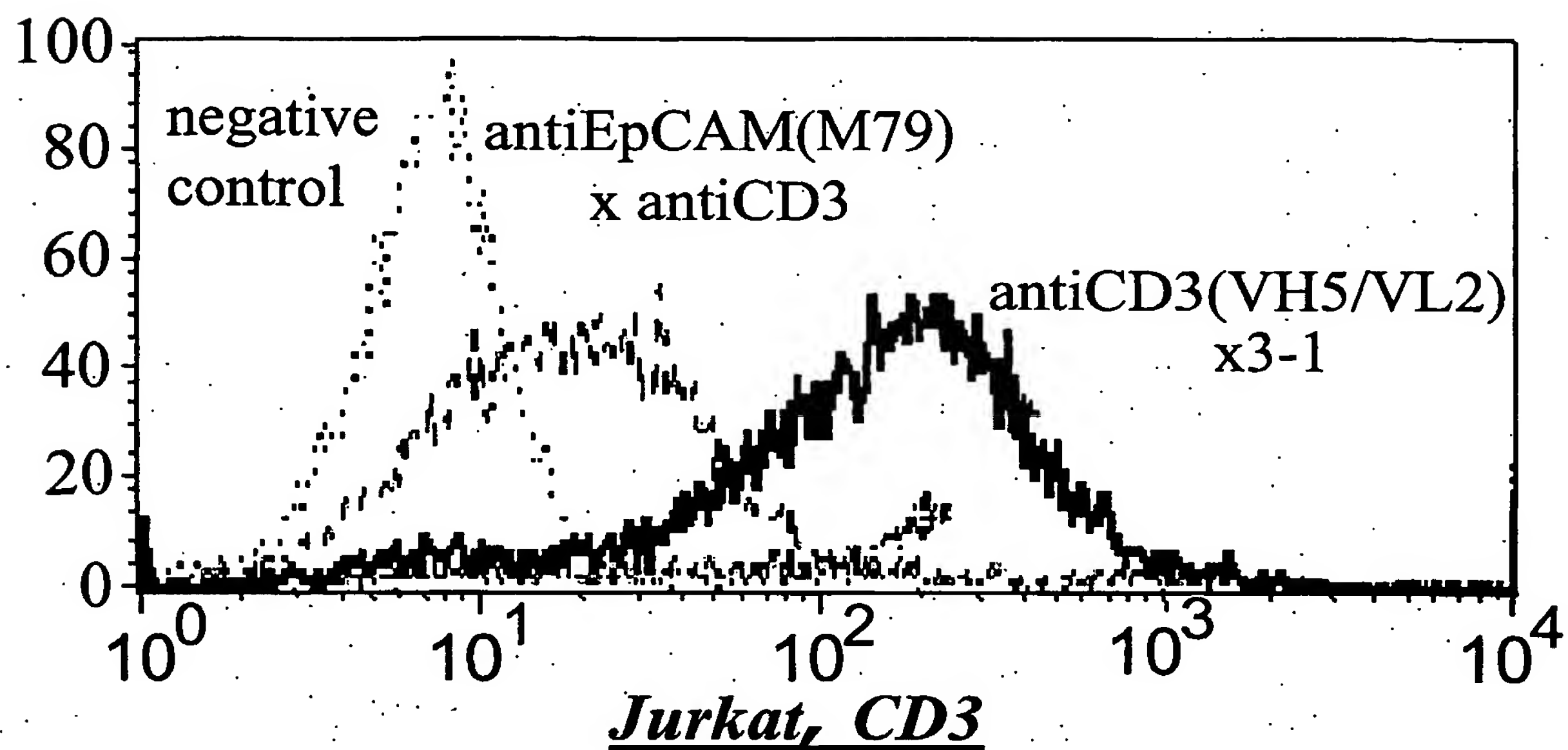
Figure 14

	FR1	CDR1	FR2	CDR2
nondeimmunized				
anti-CD3	DIKLQSGAELARPGASVKMSCKTSGYTE	TRYTMHWVKQRPQGLEWIGYINPSRGYTNYNQKFKD		
anti-CD3 VH5	DVQLVQSGAEVKKPGASVKVSKCKASGYTE	TRYTMHWVRQAPQGQLEWIGYINPSRGYTNYADSVKG		
anti-CD3 VH7	DVQLVQSGAEVKKPGASVKVSKCKASGYTE	TRYTMHWVRQAPQGQLEWIGYINPSRGYTNYNQKFKD		
anti-CD3 VH2	DVQLVQSGAEVKKPGASVKVSKCKASGYTA	TRYTMHWVRQAPQGQLEWIGYINPSRGYTNYAQKLQG		
anti-CD3 VH3	DVQLVQSGAEVKKPGASVKVSKCKASGYTA	TRYTMHWVRQAPQGQLEWIGYINPSRGYTNYAQKLQG		

	FR3	CDR3	FR4	
nondeimmunized				
anti-CD3	KATLT	TDKSS	STAYMQLSSLTSEDS	AVYYCARYYDDHYCLDYWGQGTTLTVSS
anti-CD3 VH5	RETIT	TDKST	STAYMELSSLRSED	TATYYCARYYDDHYCLDYWGQGTTLTVSS
anti-CD3 VH7	RVTIT	TDKST	STAYMELSSLRSED	TAVYYCARYYDDHYCLDYWGQGTTLTVSS
anti-CD3 VH2	RVTMT	TDST	STAYMELSSLRSED	TATYYCARYYDDHYCLDYWGQGTTLTVSS
anti-CD3 VH3	RVTMT	TDST	STAYLQMN	SLKTEDTAVYYCARYYDDHYCLDYWGQGTTLTVSS

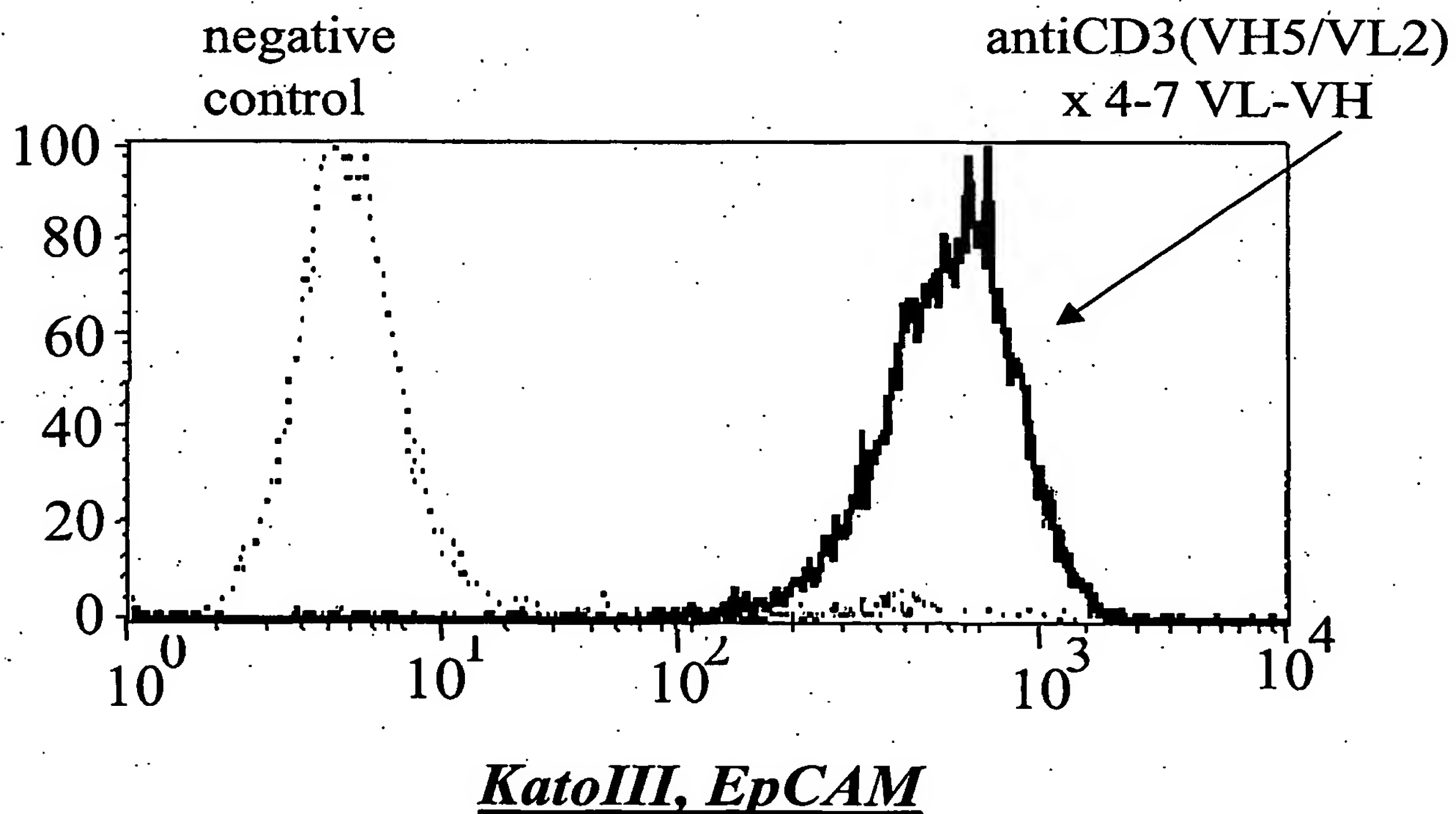
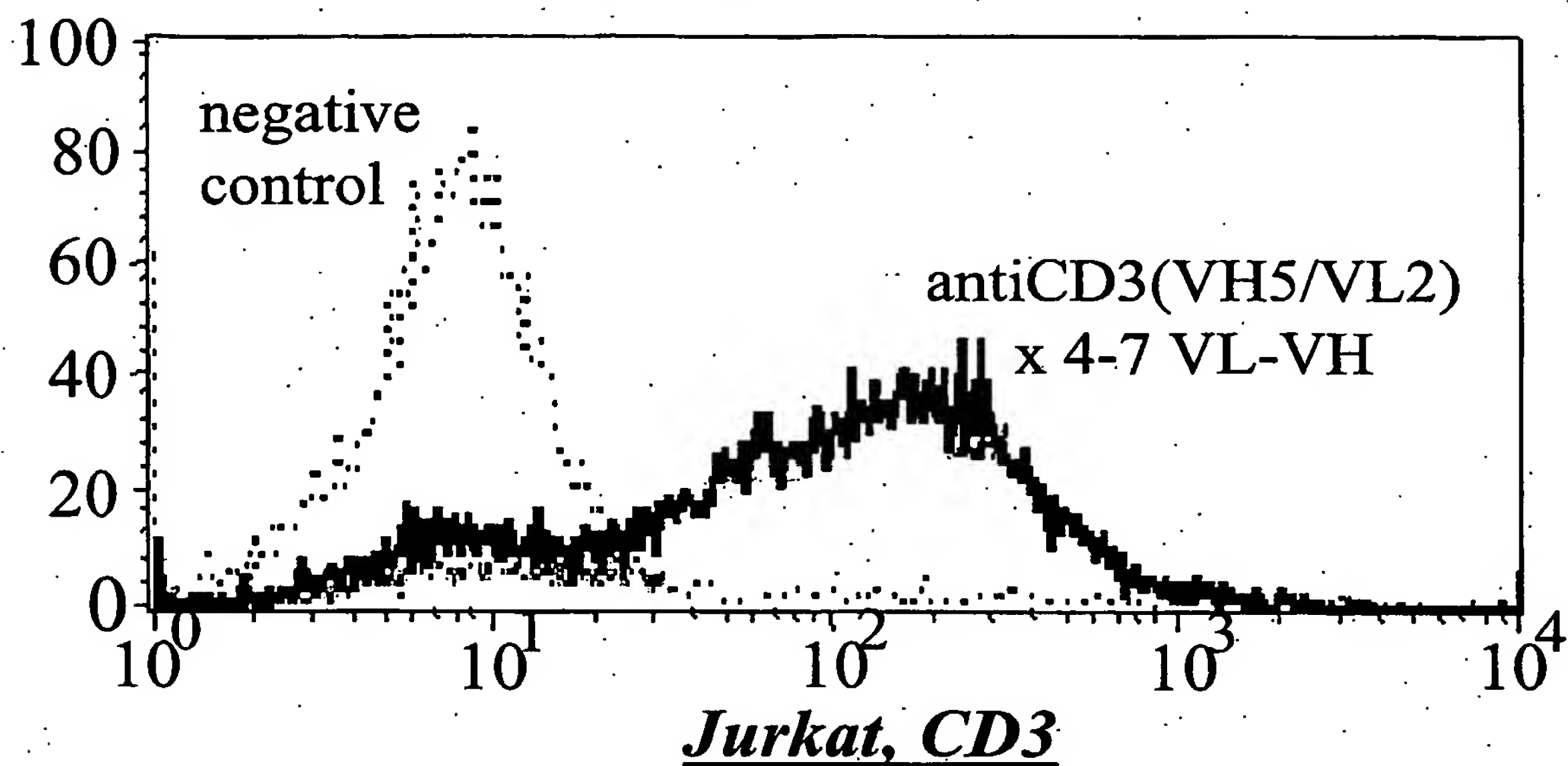
**Figure 15 A****antiCD3(VH5/VL2) x 5-10 (SEQ ID NO: 37)**

**Figure 15B****antiCD3(VH5/VL2) x 4-7 (SEQ ID NO:33)****Jurkat, CD3****KatoIII, EpCAM**

**Figure 15C****antiCD3(VH5/VL2) x 3-1 (SEQ ID NO:31)**

**Figure 15 D**

**antiCD3(VH5/VL2) x 4-7 VL-VH  
(SEQ ID NO: 35)**



**Figure 15 E**

**antiCD3(VH5/VL2) x 5-10 VL-VH  
(SEQ ID NO:39)**

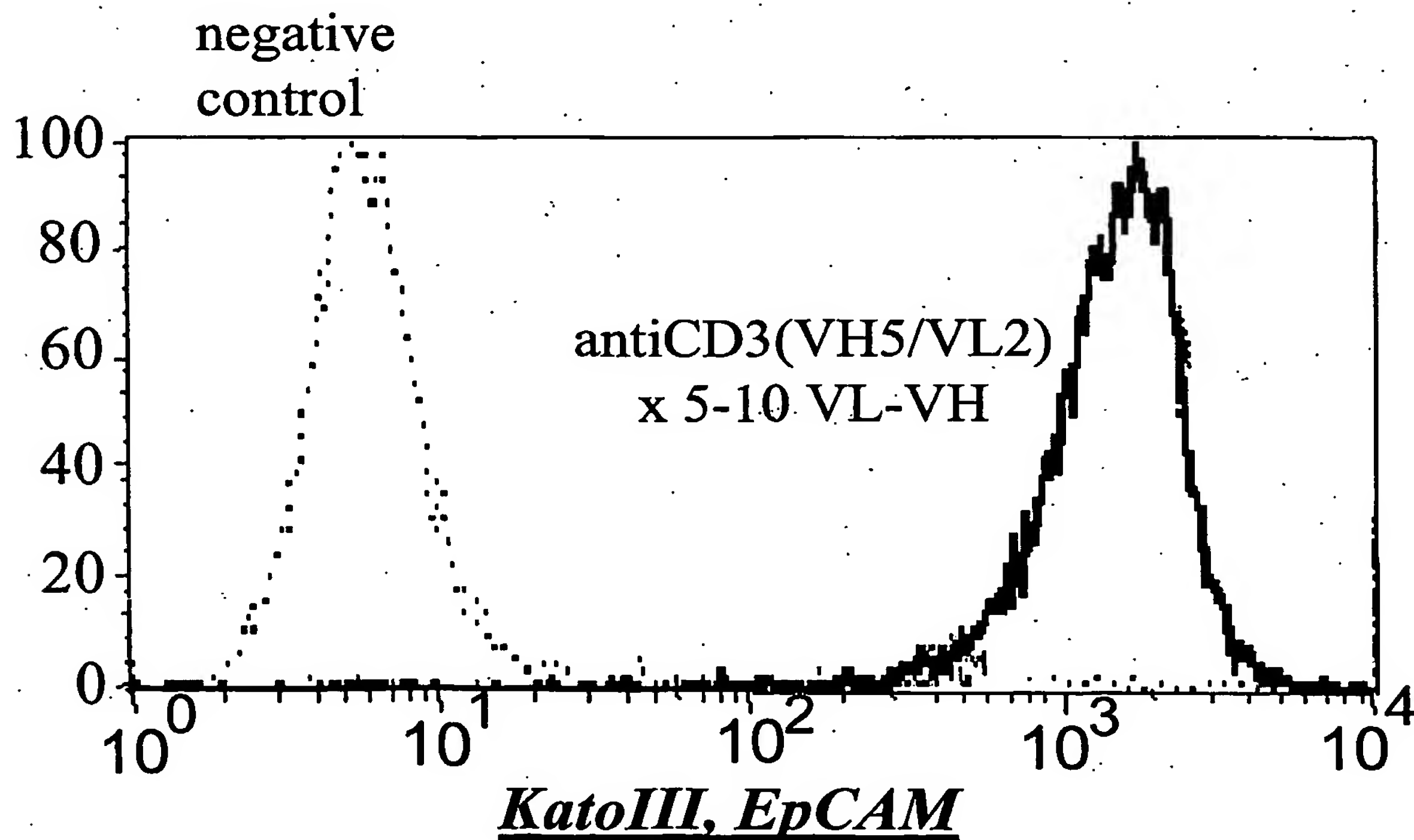
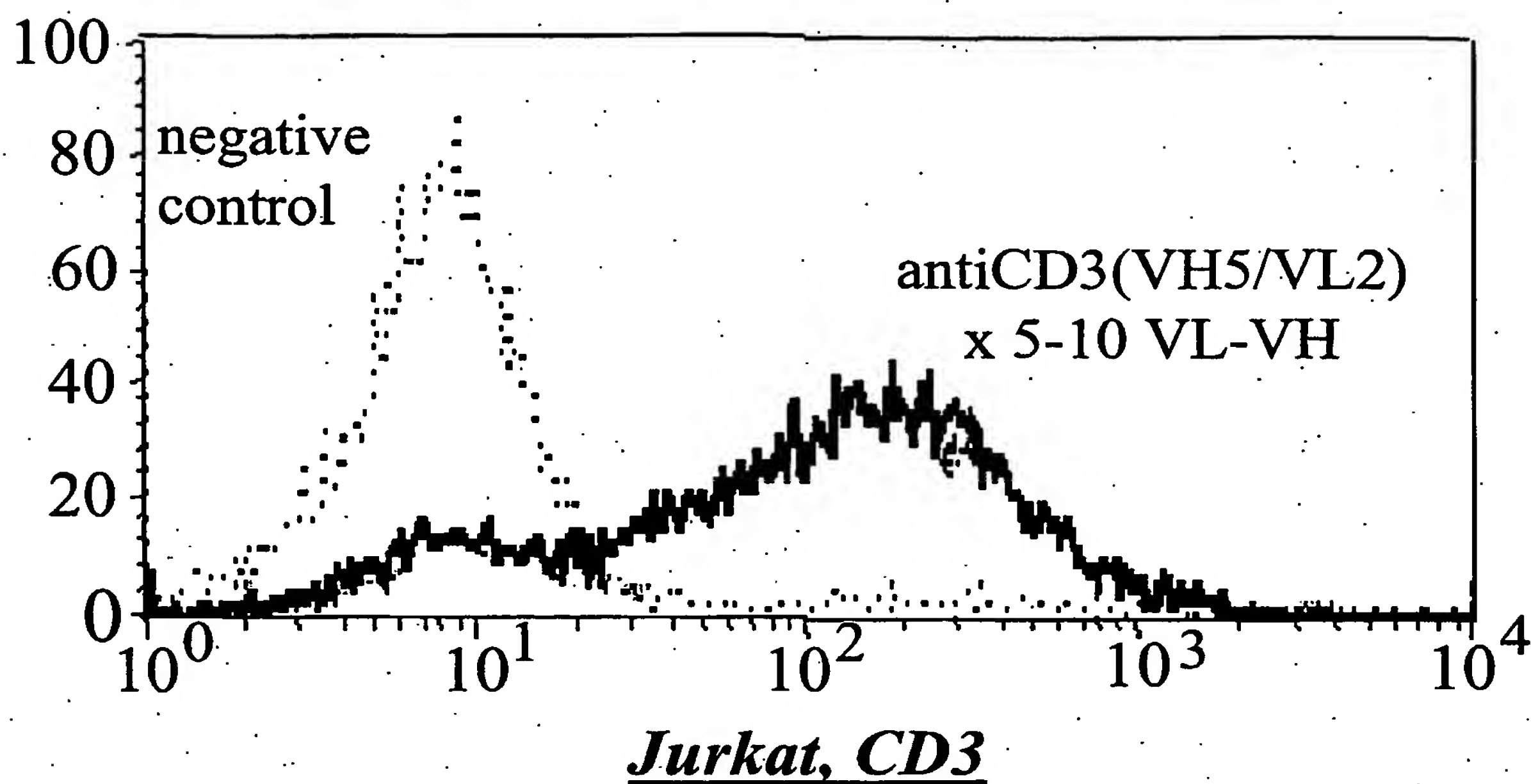
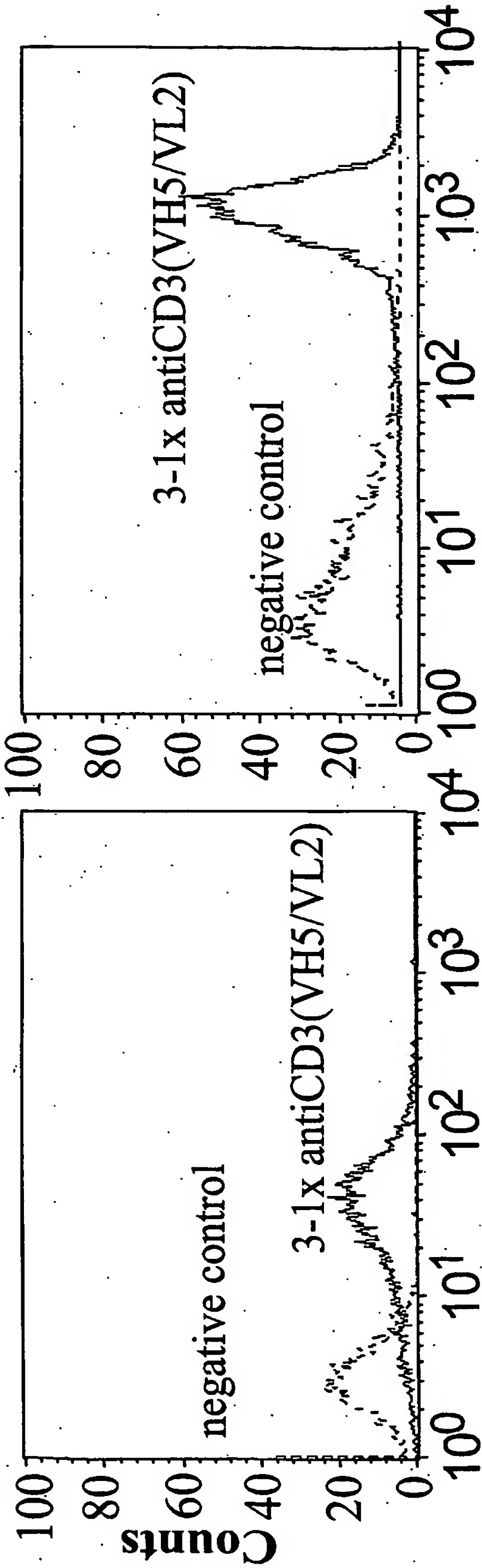




Figure 16 A

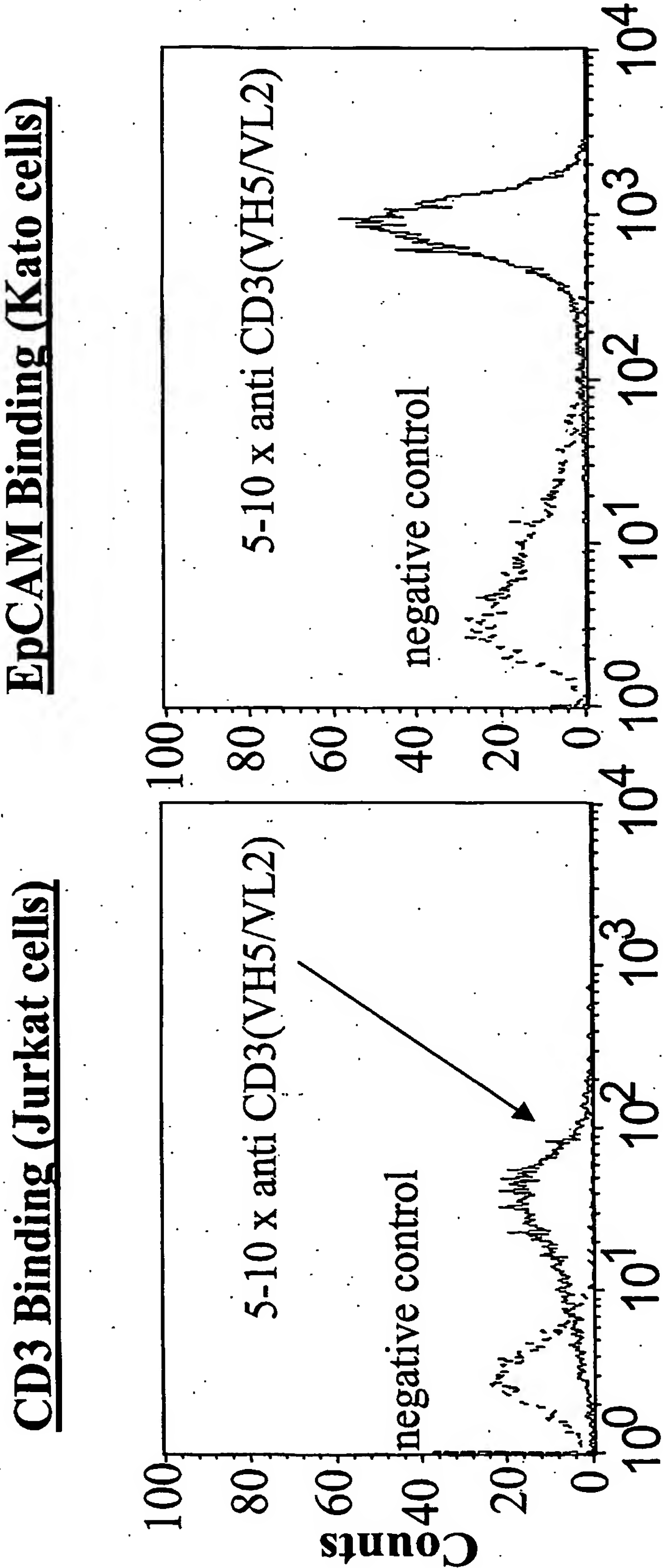
CD3 Binding (Jurkat cells)

EpCAM Binding (Kato cells)

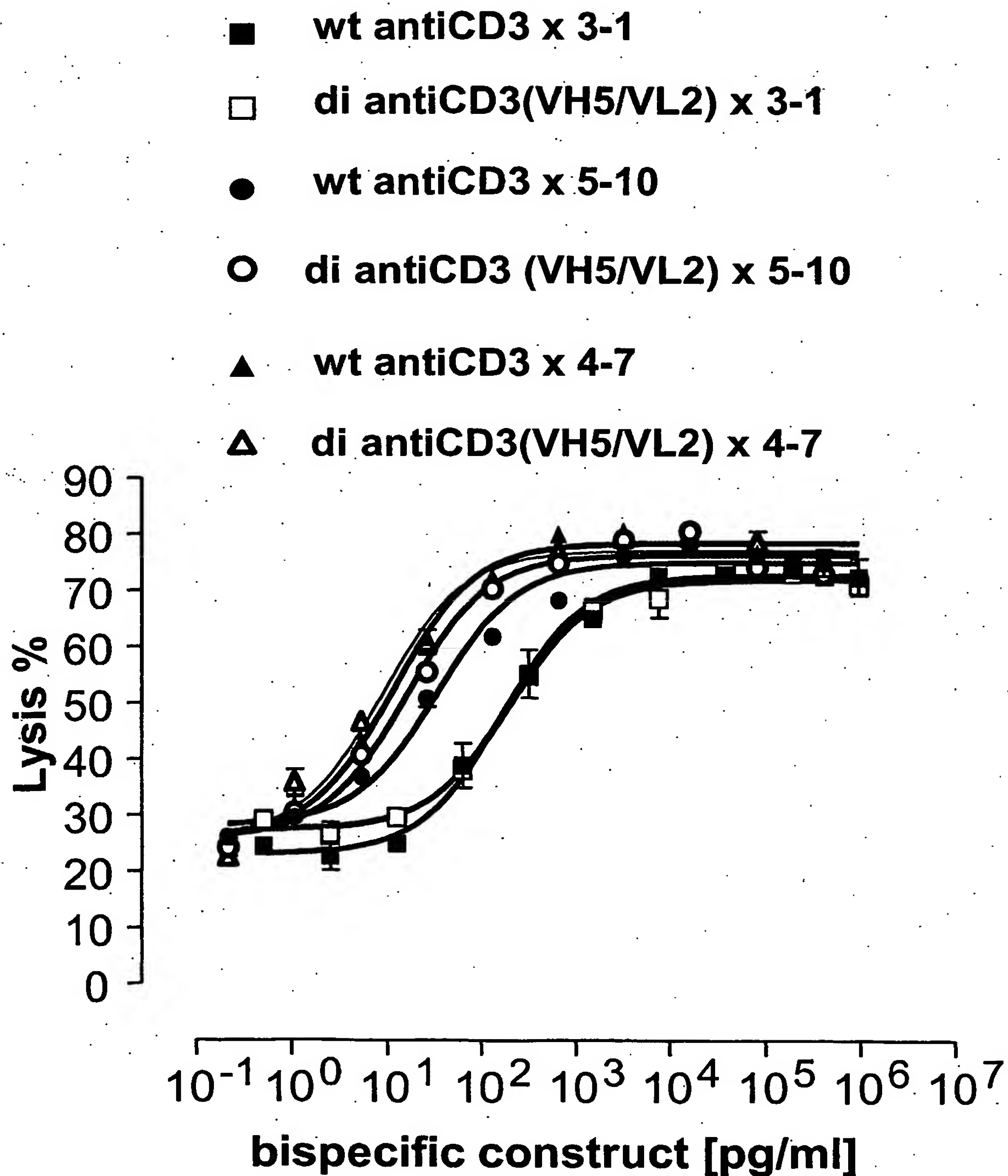


3-1 x  
antiCD3(VH5/VL2)  
(SEQ ID NO: 49)

Figure 16 B



5-10 x antiCD3(VH5/VL2)  
(SEQ ID NO:63)

**Figure 17**

**Figure 18**